# GAS JOURNAL, MARCH 30, 1938

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## Editorial Notes

### Sales Policy

THE advantages of planned co-operative selling—a policy we have for long advocated—were emphasized last week by Mr. D. C. Cross in his Presidential Address to the Southern Association of Gas Engineers and Managers. A successful attempt has, of course, been made during the past couple of years over a fairly wide area around London to arrive at a uniform selling campaign for different types of gas appliances. The experiment has proved beyond doubt the value of such co-operative effort, and we look to a wider extension of the plan, for the results which can be achieved as a body can never be equalled by the total of the results obtained individually. Sufficient experience has been gained to make group planning such that all members can participate in the general effort. As we have said before, the same series of Press advertisements, the same posters, and where possible the same price appeal, produce results over an area which could never be equalled if five or six different advertisements, five or six different stories, were being used locally; and we are glad that Mr. Cross should set such store by regional marketing. The more unified our marketing policy, the better.

We are glad, too, that Mr. Cross should emphasize once again the need for a comprehensive system of maintenance if we are to consolidate the gas load. Inevitably gas appliances of all types are becoming more refined, and the refinements which ensure automatic trouble-free operation make it increasingly necessary for the installation and after-service of the apparatus to be of the first order—which implies thorough training of the fitting staff and keen organization of the maintenance system. There can be no doubt that much of the value of expensively equipped showrooms, elaborate selling schemes, and advertising is nullified by the effect of the adverse publicity gas receives from obsolete, inefficient, badly regulated gas appliances—and far too many appliances falling into this category are yet to be found doing so-called service on the district. Particularly in rooms frequented by the public, in hotels and the like, do appliances of this nature create a damaging impression against gas. It is just as important to maintain existing apparatus in efficient working order as it is to push for new business.

The Address by Mr. Cross covered a great deal of ground, for he dealt with both works and sales problems. In regard to the former he spoke of the advantage of a uniform carbonizing system in its ability to supply a uniform type of coke. We have had much to say on the importance of deliveries of coke of constant characteristics; nothing is more irritating to the consumer or inimical to sales than indiscriminate delivery of cokes of different quality for a particular purpose. Then Mr. Cross discussed the question of coke storage, mentioning the breakage of coke which takes place in storage and how at Lea Bridge it is necessary to re-screen all coke that has been stored. Among other matters touched upon were the advantages of drying gas and the need for paying the closest attention to the condition of gasholders. His own experience of gasholder inspection, which he outlined in the Address, has brought him to the conclusion that an examination even beyond that called for by the Factories Act of 1937 is advisable.

### Consumption per Consumer

MR. CROSS explained how he tackled the problem of the black cooker—how, after three and a half years' continuous work, the task of eliminating the black cooker is practically at an end. There are many lessons to be learned from the Address, but what stands out more than anything else, we suggest, is the need for further general sales effort throughout the Industry to impress upon the public the many advantages to be gained by using more gas in their homes. It is a fact that the public spend money on fuel most reluctantly; and the sale of appliances cannot be regarded as a certain index of the progress of the Industry. It is, of course, essential that we should offer consumers the widest facilities for acquiring up-to-date gas equipment, but, as Mr. Cross pointed out, there is a tendency for the consumer to economize on his consumption to save money to pay hire-purchase instalments, for the total amount he is willing or able to spend on gas is limited. In this connexion we think we should do more to persuade landlords to install apparatus as a necessary fixture in the house, and to add the rental of appliances to the weekly rental of the house. A significant section of Mr. Cross's Address deals with the results of a decrease in the flat rate charged to prepayment consumers. This reduction did not effect an increase in gas consumption, and the general inference may be drawn that the only way to bring about a vastly increased consumption is to offer gas for additional use at such prices as will enable the consumer to substitute solid fuel by gas without incurring a fuel bill greater than formerly, or, if it does exceed that sum, of an amount which the consumer is willing and able to pay for the added convenience and labour saving of gaseous fuel.

The comments which Mr. Cross had to make on monthly accounts are interesting. The Lea Bridge District Gas Company has had this system in operation since the end of 1930, and the results have been most satisfactory. It will be noted, by the way, that consumers are not forced to pay monthly; the scheme is optional, but of the total consumers 55% pay monthly, 19% every two months, and 26% quarterly. Mr. Cross pointed out that, with monthly billing, a close watch can be kept on meters registering incorrectly, and that in

cases of abnormally high consumption, due perhaps to illness, the consumer receives his bill for the additional consumption while the reason is still fresh in his mind. Again, the Company is able to charge for rental of apparatus and also hire-purchase instalments on a monthly basis, and this has a psychological effect on a consumer with a small weekly income. A charge of, say, 1s. 4d. a month for a gas fire appears less formidable than 4s. a quarter. While Mr. Cross pointed to the advantages of monthly accounts for a district similar to that at Lea Bridge, which is a typical East End working-class neighbourhood, he expressed the opinion that monthly accounts are not so suitable, or of the same advantage, in a district with a large percentage of good class property and where consumers pay their accounts for the most part by cheque.

# The Smokeless Fuel Market

AN excellent discussion took place at a meeting of the Institute of Fuel on Thursday last following the presentation by Mr. C. W. J. Bradley and Dr. G. E. Foxwell of a Paper entitled "The Development of By-Product Coking." In that Paper the Authors traced the major developments of the coking industry and showed how it is beginning to be split into two sections—the section connected with the iron and steel groups and the section situated at collieries. The iron and steel works are realizing the ideal of a completely self-contained works in which all fuel used throughout the works is derived from the coal carbonized in the ovens, and in this way the problem of finding an outlet for the gas is solved. The Authors pointed out that within the past four years orders have been placed by British steelworks for plants to carbonize some 6,000,000 to 6,500,000 tons of coal per year, equal to one-third of the total carbonizing capacity of the industry. Nor has there been any cessation of coking at collieries. The number of coke ovens ordered by British collieries during 1934-37 was 664, having a carbonizing capacity of 9,773 tons of coal per day; and, remarked the Authors, since the market for blast furnace coke is now restricted, colliery-owned coking plants make largely for what is at present termed the gas coke market, and it is expected that in time this practice will increase.

All this calls for that measure of co-operation between coke producing interests which we have insistently advocated in these columns, and the need for which the Authors of the Paper in question emphasized. A further plea for this co-operation was made by Mr. Boon, of the London and Counties Coke Association, at the Institute of Fuel meeting. The Gas Industry is familiar with the inland coke market; the same cannot be said of the oven-coke producer, and it is quite plain that, without co-ordination in marketing—and it is not just a matter of fixing prices—future conditions will be good for neither the Gas Industry nor the coke oven industry. Mr. Boon made it clear that a slump condition is evidenced by the quantity of coke which will be available at the end of this year over the requirements of the present market. The demands of the market for coke for the iron and steel industries, for the manufacture of armaments, and for export are not stable. Already, he said, there is a weakening. Yet we believe that, with co-ordinated market development, all the coke manufactured in the country to-day could be absorbed readily. Co-ordination in the Gas Industry has resulted in a happy state of affairs in which it can sell more coke than it can make. The problem in front, however, is how to absorb the large quantities of oven coke which are likely to be thrown on the market; and this problem can only be solved by co-ordination.

# Economics of Coke Making

REGARDING the economics of coke making, Mr. Bradley and Dr. Foxwell maintained in their Paper that there is no likelihood of cheap coal being produced in by-product ovens, that it is unlikely that there will be any considerable fall in the price of coking slack, because the tendency is for the prices of the various sizes of coal to become uniform. As the demand for large coal falls, so will this tendency become more marked, and the trend will be for the price of small coal to increase rather than decrease. It is evident, remarked the Authors, that the day is passing when coke can be bought cheaply, and it is necessary for the coke oven industry to pursue a long term sales and publicity policy which will bring the public to appreciate the value of coke as a smokeless fuel. There is, of course, a strong tendency for the value of the different sizes of coal to be levelled up. Indeed, large coal is now being broken up in preparation for the market. Size is no longer the criterion of the value to be placed on coal. But Mr. Bradley and Dr. Foxwell went to the extent of placing an equal value per ton on the whole of any particular seam of coal, regardless of size—though taking ash content into account—and postulated that slack is worth no more and no less than the rest. They put forward what they termed typical figures of cost of production for a coke oven plant carbonizing 1,000 tons of coal per day. Taking a coal cost of 15s. a ton at the ovens, and a return from tar at £2 per ton, benzole at 9d. a gallon, and gas at 6d. per 1,000 cu.ft., they concluded that if the yield of saleable coke is 65%, then the sale price of coke at the ovens must be over 22s. a ton. With no sale for gas the figure was put at 27s. a ton.

If, then—and we are not concerned with any criticism of the Authors' figures—we take the statement that "slack is worth no more and no less than the rest," is a coke priced at 22s. or 27s. to be in competition with sized household coal at a cost of about 15s. a ton? Mr. Bradley and Dr. Foxwell expressed the view that equalization of values as between slack and large coal would not result either in greatly increased prices of coal for carbonizing or any decreased revenue from mining. Obviously what they had in mind was the replacement of raw coal used for household purposes by smokeless fuel; and though naturally we regard this as eminently desirable, we think that high-priced coke would, in view of the marked improvements which are being effected in coal burning equipment, find it difficult to compete with high-quality raw coal sold at a much lower price. But, remarked the Authors, slowly but surely public opinion is coming to the conclusion that the domestic fire should be smokeless: and they regard it as inevitable that public opinion ultimately backed by Parliamentary legislation will in years to come prohibit the use of raw coal in the domestic grate. So they developed their theme of pithead carbonization as the solution of the fuel problem—a solution the pros and cons of which have been argued for many years. It must not be forgotten that coal can be transported more cheaply than gas and coke to the point of consumption, and it is pertinent to ask the Authors what they consider should be the rôle of the Gas Industry in the "complete alteration in the outlook of coal mining interests" visualized in the scheme they put forward. Do they consider that gas undertakers should act solely as distributors of the gaseous fuel resulting from carbonization of coal at the pithead, and that they should cease to cater for the solid smokeless fuel market?

Pithead carbonization and the distribution of gas through a comprehensive network has been the subject of more than one impartial and close investigation, and it has been shown

conclusively that in this country it is advantageous in limited degree only. It is in the public interest that the Gas Industry and the coke oven industry that both should continue to carbonize coal for the production of gas and solid smokeless fuel, and it is in the interests of both the public and the two industries that there should be widespread co-ordination in the marketing of coke. We hope that the Paper by Mr. Bradley and Dr. Foxwell, and the discussion to which it gave rise, will, by focusing attention once more on this aspect, further practical steps to this end.

# The Radiation Meeting

"It has been my earnest endeavour to make the shares in your business a gilt-edged industrial investment, and so far I think we have succeeded." These words from the speech of Mr. H. James Yates, the Chairman, at last week's Annual General Meeting of Radiation Limited are one more sign of the solid service which the Gas Industry renders to the community. It is not by sudden spurts, by peak periods of trading with the deep dark valleys between, that a "gilt-edged" position can be built up by any industrial concern, but rather by steady progress through the years and by the harbouring of resources for the further development of business to the benefit of the customer. The producing side of the Gas Industry, so far as it is company owned, prides itself upon the suitability of its securities for every type of investor. It is more than satisfactory to regard the solidity, also, of the affairs of the largest firm of gas appliance makers, and the prestige value to the Industry of its status among investors must be very considerable indeed.

The fact that Radiation shares are so widely held among all sections of the public places heavy responsibility upon Mr. Yates in making his annual statement; in the good cause he has to face the publicity which, as the Industry recognizes not always without regret, is not to his personal liking. He never fails, however, to turn the occasion to good account, and to emphasize to his very wide "audience" the services which gas is rendering to humanity. This year was no exception. Naturally there was reference to increased costs of material and labour, not completely offset by two small advances in selling prices which in any case had been delayed until the last possible moment. There was reference also to severe competition, but Mr. Yates' way of meeting competition is by the continual development and improvement of apparatus for which Radiation is so well fitted by years of intensive research. This, it would appear, becomes still further intensified as time goes on, and the Gas Industry will be immediately intrigued by the statement that "as a result of our continued research we have in hand some very remarkable developments which I believe will add more than ever to the comfort of using gas fires, and will result in their still wider application." It is good news, also, that Radiation are continuing the close study of dietetics in their research kitchens. It will be remembered that Mr. Yates referred to this matter a year ago in some detail. There are, he says, still many intricate problems to be investigated, and he is hopeful that in due course there will be attained further valuable results in this sphere which is of such moment to our Industry. The whole Gas Industry, as well as Radiation shareholders, will rejoice at Mr. Yates' announcement that a large order has been obtained for gas cooking apparatus for the kitchens of the Birmingham Hospitals Centre, which is to be opened by His Majesty the King on July 14. It is not every day that the equipment of 4,150 sq.ft. of kitchen floor area has to be undertaken.

To one other matter in a most interesting general survey we must briefly refer. It is essential for the welfare of the Gas Industry that we should be able to offer to consumers gas appliances at as low a price as is consistent with the highest quality and with continual technical advance. Too often the demand is heard from gas undertakings for cheaper appliances without, we fear, due consideration being given to the qualifications mentioned, and to certain others which have an important bearing. In any case Mr. Yates called attention to one respect in which all can help when he discussed economic manufacture and simplification of production from the aspect of standardization. This is a matter to which we have referred on previous occasions, and it is safe to say that manufacturers of every type of plant and appliance will warmly support Mr. Yates' contention. There can be no doubt that fancy—sometimes even frivolous—demands are made which spell nothing but waste, and waste is a hindrance to efficiency which in these days must be sternly eliminated.

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## Interesting the Builder and Architect

This month has marked the commencement of a national drive by the American Gas Industry to interest the architect and builder in the service which gas can render in the modern home; and we congratulate our American confrères on the way they have set about to organize their campaign. The organization is certainly thorough. As a first step is the announcement in an architectural journal of two competitions sponsored by the American Gas Association, the prize money totalling $23,700. One of the competitions is for architects, $13,700 being offered in prizes, for the best design of a completely gas-equipped house; the other competition, with $10,000 as prize money, is for builders. The Association, too, as a feature of the campaign, has in mind the erection of one or more of the prize-winning model homes, fully equipped and furnished, at next year's New York World's Fair. The Gas Industry does not intend to furnish house plans, but will refer all prospects to local architects and builders; and it will establish a service for architects and builders in all matters pertaining to gas appliance installation, and, through demonstration homes, assist in interesting the general public in the use of gas appliances for new home construction and modernization. It is contemplated that hundreds of model all-gas homes will be erected throughout the States along the lines of the prize-winning designs. This campaign is the most far-reaching attempt so far made by the American Gas Industry to acquaint architects and builders, and through them home owners, with the fact that gas is the ideal fuel for the home; and we hope that the endeavour will meet with the reward which such bold planning merits. The campaign is well timed, as it coincides with a National Housing Act aimed at stimulating the building of houses.

## Tar Reconditioning Plant

The maintenance in good condition of the tar used as a seal for a 4 million cu.ft. holder of the M.A.N. type was the subject of a helpful Paper contributed by Mr. D. J. Ward, of the Birmingham Gas Department, to the Midland Junior Gas Association. The sealing tar originally employed—the holder was brought into commission at the end of 1930, and 86 tons of tar were needed for introduction into the seal and various chambers—contained very little benzole vapours and light oil fractions up to 160° C., and during the winter months the tar on the walls below the piston absorbed these vapours from the gas. On the approach of summer the temperature rose and benzole vapours were given off from the tar above the piston, rendering the atmosphere above the piston extremely unpleasant for those whose duties took them inside the holder for any length of time. After the holder had been in commission for about two years, conditions were such that it was decided that the tar must either be reconditioned or changed. A separate reconditioning plant was considered, but it was concluded that this was not economically

practicable. The final decision was to follow on the lines of Messrs. Langford & Tooby, of Coventry, and the "L & T" system of tar reconditioning was adopted. Mr. Ward gave a full description of this interesting system and its operation. Such an installation, he explained, definitely improves the condition of the sealing medium in an M.A.N. waterless gasholder. By its use the atmosphere above the piston is maintained in a sufficiently pure state to allow of a person remaining inside for long periods without any inconvenience. The difference before and after the plant was put to work has been most marked. The Author cited a particular instance of this when it was necessary to re-paint the piston. This work was carried out by the works painters over a period of weeks, the men working each day for the full number of normal working hours without any sign of discomfort or distress. The work could not have been undertaken with such ease and dispatch had not the atmosphere above the piston been in good condition. Mr. Ward concluded his Paper by referring to safety precautions for waterless holders, enumerating the steps taken at the Swan Village Works of the Birmingham Gas Department to ensure conditions such that the holder can be worked without fear of accident and that work in and around can be carried out in comfort.

## Training

In a lively Presidential Address to the Midland Association of Gas Engineers and Managers last week Mr. Fred Davies, of Walsall, recalled the time when at Widnes, where he received his early training in the Gas Industry under the late Mr. Isaac Carr, the net cost of gas into holder was a minus quantity. Mr. Davies spoke of the view taken by Mr. Carr that young men entering the Industry with the hope of ultimately attaining executive positions must learn to understand the problems of general management, financial control, and the commercial side of the business, and it is lack of this knowledge which Mr. Davies deplored in the general education of the rising young men in the Gas Industry to-day. Early specialization becomes more and more the order of the day, but there is no doubt that those who aspire to management should have a full insight into both dometsic and industrial salesmanship, and this part of the training of the gas manager has been too much neglected in the past. The technical and commercial man combined is fitted for executive position; his technical knowledge will guide him in arriving at decisions in important matters of administration. The technical official without commercial training, knowledge, and ability is not fitted for the post of manager, in which position, in most undertakings, administration and selling form the major part of his work. Speaking of the development of the industrial load, Mr. Davies pointed to the urgent need for adequately trained industrial salesmen; and, in view of the obvious scope, it is certainly surprising that more young men within the Industry are not equipping themselves to fill such positions. On this matter of training we think that industrial salesmen should pay more attention to the practical applications of competitive fuels. Knowledge of appliances using competitive fuels increases a salesman's prestige when interviewing prospective customers, and he is able to put his finger on the very spot where competitive fuels may fail in the particular application under discussion. The salesman who can discuss alternative fuels with equal knowledge can more easily satisfy a customer that he is getting a fair and logical statement of town gas. Walsall, Mr. Davies explained, has recently appointed an industrial gas salesman and is a member of the Midland Industrial Development Centre; and, he said, it is surprising to discover the amount of business to be gained when once the development of the industrial gas load is tackled in a thorough manner.

## Hot Coke Conveyors

A wealth of useful information on the conveying of hot coke is contained in a Paper which Mr. C. H. Ward, Mechanical Engineer at the Beckton Works of the Gas Light and Coke Company, gave this month at a meeting of the London and Southern District Junior Gas Association. The Author dealt particularly with the Le Fleuve system and gave detailed capital costs and maintenance costs, comparing the system with the De Brouwer drag chain conveyors which it replaced. For three retort houses the comparative maintenance costs of De Brouwer conveyors and Le Fleuve conveyors were given as 7·9d. and 3·2d.; 8·6d. and 4·7d.; and 8·4d. and 3d. respectively per ton of coke handled. Mr. Ward devoted considerable attention to the constructional aspect of the Le Fleuve system and discussed the relative merits of reinforced concrete and cast-iron troughing. A rather surprising feature of the system is that it produces a smaller quantity of large coke than the De Brouwer, the difference being in the neighbourhood of 4%. Presumably the steam formed within the coke on its being immersed in the water in the trough has a disruptive effect. As a result of a large number of tests the large coke (over 3 in.) has been found to contain from 2% to 4% moisture, and the broken coke (0-1¾ in.) from 10% to 12%.

# Forthcoming Engagements

**March.**

**31.**—**S.B.G.I.**—Council Meeting, 2.30 p.m.

**April.**

**1.**—**I.G.E.**—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
**2.**—**Scottish Eastern Juniors.**—Visit to Aitken Colliery. Paper by G. Jenkins on "Coal Analysis."
**5.**—**I.G.E.**—Research Executive Committee, 2.30 p.m.
**7.**—**I.G.E.**—Joint Committee on Complete Gasification under Pressure, Fuel Research Station, Blackwall Lane, East Greenwich, S.E. 10, 11 a.m.
**7.**—**Midland Juniors.**—Meeting and Paper by W. L. Howe, of Nottingham, on "Gas and Filtration and Heating of Swimming Pools."
**8.**—**North British Association.**—Spring Meeting at Coatbridge.
**8.**—**Coke Salesmen's Circle.**—Meeting with Coke Distributors' Branch of the L.C.C.A., Gas Industry House, 7 p.m.
**9.**—**Manchester and District Juniors.**—Annual Dinner. Paper by W. Hodkinson on "Technical Work in a Holding Company."
**11.**—**I.G.E.**—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; Benevolent Fund Committee of Management, 3 p.m.
**22.**—**B.C.G.A.**—Joint Conference Northern and Yorkshire Districts at Scarborough.
**23.**—**Western Juniors.**—Annual Meeting at Swindon. Presidential Address by J. E. Akroyd.
**23.**—**Midland Juniors.**—Visit to Central Laboratories and Automatic Water Gas Plant, Nechells Gas-Works, Birmingham.
**23.**—**Yorkshire Juniors.**—Meeting at Leeds. Paper by G. F. Murray, of Sheffield, on "Water Heating by Gas."
**26.**—**I.G.E.**—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.
**30.**—**London and Southern Juniors.**—Visit to Beckton Gas-Works of the Gas Light and Coke Company.

*There will be no meeting of the Central Executive Board of the National Gas Council or of the Central Committee of the Federation of Gas Employers during the month of April.*

**May**

**2.**—**I.G.E.**—Research Executive Committee, 2.30 p.m.
**3.**—**I.G.E.**—Finance Committee, 9.30 a.m.; Membership Committee, 10 a.m.; General Purposes Committee, 11 a.m.; Council, 2.30 p.m.
**3.**—**London and Southern Juniors.**—Annual Business Meeting.
**5.**—**Midland Juniors.**—Annual General Meeting. Address by R. J. Rogers.
**6.**—**North of England Association.**—Annual Meeting at Newcastle-upon-Tyne.
**7.**—**Manchester and District Juniors.**—Visit to Rochdale. Paper by H. J. Bradshaw.
**14.**—**Scottish Eastern Juniors.**—Annual General Meeting at Dunfermline. Presidential Address of A. C. Rea.
**17.**—**I.G.E.**—Gas Education Executive Committee, 2.30 p.m.
**19.**—**Wales and Mon. Association.**—Annual Meeting under Presidency of Mr. J. Stephenson, Aberdare.
**21.**—**Yorkshire Juniors.**—Meeting at Matlock. Papers by C. W. Hemmingway, A. P. Jennings, and T. W. Pickthall.
**21.**—**Scottish Juniors.**—Joint Visit to Neasden Works of Ascot Gas Water Heaters, Ltd.
**26.**—**Midland Association.**—Spring Meeting at Walsall.
**31.**—**June 1, 2, and 3.**—**I.G.E.**—75th Annual General Meeting.

**June**

**22-23.**—**B.G.F.**—Visit to Empire Exhibition, Glasgow.
**24.**—**Southern Association.**—Summer Meeting at Lea Bridge.

# Personal

Dr. F. S. SINNATT (Director of Fuel Research) has been elected a Fellow of the Royal Society.

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After a quarter of a century with the Penicuik and District Gas Company, Mr. J. RICHMOND is to retire from the position of Engineer and Manager.

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On March 23, Worshipful Brother E. PERCY STEVENSON, of the Primitiva Gas Company, was invested as Worshipful Master of the Evening Star Lodge, No. 1719.

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Mr. CHARLES EASTWOOD (Chairman of the Preston Gas Company) has been appointed Sheriff of the County Palatine of Lancaster for the ensuing twelve months.

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Mr. T. V. JOHNS has been appointed Managing Director and Engineer of the Lowestoft Water and Gas Company. He formerly held the position of General Manager.

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Sir WILLIAM GRAY, a Director of the Hartlepool Gas and Water Company, has been appointed County Sheriff for Durham. He has been a Deputy-Lieutenant for the past six years.

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Mr. EDMUND BATES has been appointed Assistant Industrial Representative of the Manchester Corporation Gas Department. During the past four years Mr. Bates has been Senior Technical Assistant at Stalybridge.

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The Dumfries Gas Committee have recommended the appointment of Mr. S. JOHNSTONE (Assistant Manager) as Engineer and Manager in succession to Mr. S. Dickie, whose retirement was recently referred to in these columns.

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In succession to the late Mr. R. Campbell, Mr. R. CORBETT has been appointed Engineer, Manager, and Secretary to the Carrickfergus (Co. Antrim) Gas Company, Ltd. Mr. Corbett was previously with the Cookstown Gas and Light Company.

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A clock has been presented to Mr. W. W. ATLEY, Engineer and Manager to Stockton Corporation, who, as already announced in these columns, has been appointed to a position with Messrs. Athole G. Allen (Stockton), Ltd. The presentation was made by Mr. F. L. Scaife, Assistant Engineer and Manager.

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We referred last week to a presentation made to Mr. GEORGE WILKES by the Murdoch Lodge, to mark the celebration of his Golden Wedding. Another presentation was made to him in the same connexion by his colleagues in the Parkinson & Cowan group, with whom he has served more than 47 years. The presentation was made at the Imperial Hotel, Birmingham, and took the form of a Westminster and Whittington chiming clock. Mrs. Wilkes received a gold wristlet watch.

# Obituary

Mr. JAMES LEONARD WEST, who was the first Secretary of the Edenbridge Gas Company, died on March 11, aged 87.

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We regret to record the death on March 22 of Mr. CHARLES LORD, for the past sixteen years the Northern Sales Representative of Metropolitan Gas Meters, Ltd. Mr. Lord was taken ill suddenly in Birmingham just prior to the opening of the British Industries Fair, and was removed to a nursing home where he died after undergoing two serious operations.

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The Newcastle-upon-Tyne and Gateshead Gas Company has suffered a severe loss in the sudden death on March 25 of Mr. JOHN R. HEPPLE. Mr. Hepple arrived at business as usual on that morning, but was taken suddenly ill and died at his home later in the day.

He entered the service of the Company in 1905, and later became Manager of the Gateshead Showrooms, succeeding Mr. A. B. Roxburgh, on the latter's retirement in 1933, as Domestic Gas Sales Manager to the Company.

Mr. Hepple was very well known on the North-East Coast for his many activities in the Industry, and in wider circles as a public lighting expert. He was a member of the Joint Lighting Committee of The Institution of Gas Engineers, of the Illuminating Engineering Society, and the Association of Public Lighting Engineers.

In his speech to the shareholders at the Annual Ordinary Meeting of the Company on Feb. 22, the Chairman, Mr. John E. Cowen, said: "We are indebted to Mr. J. R. Hepple who has become an expert on public lighting, for the very effective work he has done in this field. We have in our district some of the best installations of public lighting by gas in the country, and with our public lighting tariff can compete against any form of lighting with success and satisfaction."

Mr. Hepple was a prominent Freemason and a Past-Master of the Gosforth Lodge. He was 54 years of age, and leaves a widow and one daughter.

# Letter to the Editor

## Gas-Works Fauna

SIR,—I have read Mr. Tew's and Mr. Helps' contributions with much interest and venture to send you herewith a list of the birds and animals which are to be found on the Bromley-by-Bow Works of the Gas Light and Coke Company. The list is as follows:

10,000 starlings—autumn migratory flock.
Colony of wild rabbits—estimated 50 in number.
Hedgehogs—specimens attracted by saucers of milk.
Ringdoves—six specimens, nests found.
Pigeons—the usual flock to be found anywhere in London.
Kestrels—one pair which nest on No. 9 holder.
Carrion crows—also on holders.
Seagulls—usual winter flock.
Skylarks—specimens nest.
Meadow pippits—specimens nest.
Stonechats—two nesting pairs observed this March.
Goldfinches—autumnal flock visits regularly, though not observed in nesting season.

Pied wagtails, yellow wagtails, robins, missel and song thrush, and spotted flycatchers have been seen also. The song of the marsh-tit has been heard by the River Lea. A nightingale was reported, but not verified. Swans and herons are regularly observed in passage over the Works. A red admiral butterfly was observed flying round the ammonia washers in September, 1937, and a tortoiseshell was seen in February of this year. The latter observation is a comment on the spring weather recently enjoyed in London.

We find, also, mallard and waterhens nesting. In 1937 a mallard duck brought off a clutch of eleven and with the assistance of the drivers on the oil gas plant got them all safely launched into Bow Creek.

The starlings mentioned above gather on the Works in October, either preparatory to flight to a larger roost or for a definite southward migration. They gather in increasing numbers up to 20,000 for a month every autumn and then literally disappear overnight. This year they travelled with the October full moon, two days before the equinoctial gales set in—Oct. 27 to be exact. Starlings seem to have a predeliction for gas-works, as they roost on other works of the Gas Light and Coke Company. There used to be a winter roost at Kensal Green, while the Fulham gasholders are still frequented by a small roost throughout the winter. It would seem that Fulham is a gathering place for the starlings that feed over the open spaces in West London. It is a fact that there is no roost in such places as Richmond Park and that at evening time starlings can be observed flighting townward from there.

The rabbits, I think, are most interesting, as a colony of such is not to be expected in the heart of the industrial East End. Our Station merits this description as Bromley is surrounded by buildings and factories and lies only half a mile behind the Docks. There are various accounts given of their presence—that they were introduced by one of the Engineers to provide a shoot, or that when the Works was laid down the district was open country and the rabbits have survived some fifty years from that time. Ecologically they are interesting in that they must keep up their strength by inbreeding, apparently without suffering ill-effects. They are quite bold and cause the gardener much annoyance by attempting to make burrows in his flower beds. In general, however, the ground is so unsuitable for burrowing that most of them live as do hares in forms.

On the whole I do not think that we see so much of Nature red in tooth and claw as does Mr. Tew at Gloucester, but as an unexpected London sanctuary you may find us interesting.

Yours, &c.,
"RUS IN URBE."

*March* 22, 1938.

# United Kingdom Meeting Postponed

Close Brothers, Ltd., Secretaries, announce that owing to the indisposition of Mr. R. B. H. Ottley, Chairman of United Kingdom Gas Corporation, the annual meeting has been postponed until Monday, April 25, 1938.

As the final dividend of 3%, less tax, on the Ordinary shares requires the confirmation of the shareholders, this dividend will be paid on April 28, 1938.

# News of the Week

**The Sanction** of the stockholders of Northampton Gas Light Company has been given to the raising of over £35,000 additional capital to be used for carrying out various additions and improvements, including the reconstruction of the showrooms in Abington Street, Northampton.

**In Addition to a Display of Gas Appliances** of all types on their stand at the Kent Home and Fashions Exhibition at Maidstone, the Maidstone Gas Company staged a popular attraction, by engaging Miss Lockey, a lightning caricaturist, to tell the story of gas in sketches.

**A Series of Cookery Demonstrations** is a feature of a gas exhibition now being held by the Loughborough Gas Department at the Lecture Room, Town Hall, Loughborough, from March 28 to April 1. The opening ceremony was performed by His Worship the Mayor, Alderman A. Lacey, J.P.

**The Head Offices and Showrooms** of the Wolverhampton Gas Company at the corner of Darlington Street and Waterloo Road are to be rebuilt. The present buildings were erected in 1880, and although nine years ago more modern showrooms were provided in Darlington Street, the premises are now inadequate to deal with the expansion in the Company's business. The new building will include special public rooms, and a stage from which cookery demonstrations can be given.

**Last Week's Sessions** of the *Kentish Mercury* Food and Health Demonstrations were held at Dulwich, where, as usual, the South Metropolitan Gas Company co-operated with cookery lectures and a display of gas appliances. The sessions were inaugurated by Mr. Bracewell Smith, Member of Parliament for Dulwich, who observed that the *Kentish Mercury* and the South Metropolitan Gas Company were doing great work in arranging these demonstrations. This week the venue is Woolwich, where a similar programme is being organized.

**Over 50,000 Quarterly Consumers** in the area of the Newcastle-upon-Tyne and Gateshead Gas Company have received an illustrated folder, the object of which is to demonstrate how inexpensive it is to modernize the home with gas—particularly when the consumer has availed himself of the domestic tariff of the Company which provides gas at less than half-price. The folder comprehensively covers every aspect of gas service in the home. "Our customers," runs the folder, "in increasing numbers, are converting their cooking, room-warming, and water-heating services to 'all-gas,' entirely eliminating solid fuel from their homes."

**Increases in Annual Costs** amounting to some £30,000 have led the Plymouth and Stonehouse Gas Light and Coke Company to increase prices to its consumers. Explaining the causes, Colonel R. L. Norrington, Chairman of the Company, pointed out that a normal year's supply of coal now cost over £21,000 more than formerly. The cost of oil had risen by £3,000 per annum. During the past two years national awards had increased wages by £6,000 a year. The new charges, which come into operation after the March quarter meter readings, range from 7½d. to 4¼d. per therm, according to the amount consumed. On prepayment meters the charges will be 10d. per therm, and small additional charges are to be made in outlying districts.

## Amalgamation and Grouping

### Coatbridge and Airdrie.

The Airdrie Town Council on March 24 rejected the offer of Coatbridge Gas Company to purchase the Airdrie Undertaking.

The Coatbridge Company offered to redeem the outstanding debt on the Airdrie Undertaking, amounting to £20,000, and to supply gas immediately to Airdrie consumers at the Coatbridge rates. Domestic users in Coatbridge pay 8·4d. per therm, against 1s. 0½d. in Airdrie, and it was estimated that there would be an annual saving to Airdrie consumers of about £8,000. But the Town Council has decided to modernize plant at their Gas-Works at a cost of approximately £20,000; new vertical retorts are to be erected.

Dean of Guild Thom, Convener of the Gas and Lighting Committee, who moved at the Council meeting that negotiations with the Coatbridge Company be continued, has resigned his convenership. A proposal that a plebiscite of ratepayers be taken on the subject was also defeated at the meeting.

**The Annual Meeting** of the Wales and Monmouthshire Association of Gas Engineers and Managers will be held on May 19, under the Presidency of Mr. J. Stephenson, of Aberdare.

**Considerable Interest** was taken last week in the exhibition of gas appliances held by the Ramsbottom Gas Company in the Co-operative Hall and opened on March 21 by Councillor William Holden, Chairman of the District Council.

**Extensions of Gas Mains** at an estimated cost of £3,080 was approved by the Aberdeen Gas Committee on March 23. The extensions will be carried out in the Balgownie area, Kaimhill, Raeden, Woodburn Avenue, and Braeside, Mannofield. Improvements to one of the vertical retort benches at the Gas-Works, costing £820, were also approved.

**A "Home and Health" Exhibition** recently held at Leyland was attended by over 2,000 consumers. Cookery lectures were given by Miss Fitzgerald and health talks by Mr. T. Bowen Partington. Another attractive feature of the exhibition were the cake-baking competitions for adults and children; nearly 330 entries were recorded for an "Ascot" water heater competition. The opening ceremony was performed by the Chairman of the Leyland Urban District Council.

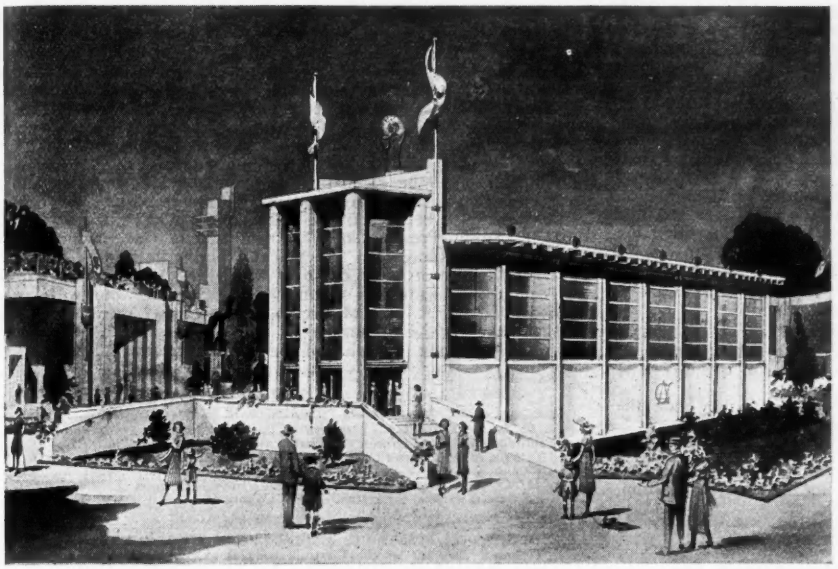
**We Have Received** from the publishers, Messrs. Andrew Reid & Co., Ltd., Strawberry House, Leaze Park Road, Newcastle-upon-Tyne, 2, a copy of their "Handy Colliery Guide" for Northumberland, Durham, Yorkshire, Cumberland, and Westmorland for 1938. The favourable reception accorded former issues proves in a practical manner the need for such a work. The publication has been carefully revised from the latest official returns and other sources. It aims at giving in concise form such information as will be of service to those whose time is too limited to allow of their referring to the various authorities on the subjects they require.

**From "Measure for Measure,"** the Reading Gas Company aptly quote "Here comes a man of comfort, whose advice hath often stilled my brawling discontent" in the opening pages of a recently published booklet in which they set out the service offered to consumers in their area of supply. Their "man of comfort," of course, is Mr. Therm, and the various appliances he has to offer are shown in attractive typical settings in great profusion. The consumer is also told something of the residuals of the gas manufacturing process; at the head of this section is a general view of the Company's Works, and this is bound to create a most favourable impression in the consumer's mind, so tidily and handsomely are they laid out. An interesting glimpse into the past is provided by a picture of balloons being filled at the Reading Works on the occasion of the Aero Club visit in 1906.

## Gas at National Trades Exhibition

**Our photograph shows the striking display arranged by the Parkinson Stove Company, Ltd., at the National Trades Exhibition now running at the Bingley Hall, Birmingham.**

# The Gas Pavilion at the Glasgow Empire Exhibition



The accompanying illustration shows the Architect's drawing of the Gas Pavilion at the Empire Exhibition to be held at Glasgow in May. It has been designed by Mr. G. Gardner-McLean, O.B.E. (President of the Glasgow Institute of Architects, and Chairman of the Scottish Branch of the Garden Cities and Town Planning Association). The building will have a total length of 92 ft., with a maximum width of 66 ft. and an internal height of 20 ft., providing a total floor area of 4,000 sq.ft. The Gas Pavilion will embrace the domestic and commercial applications of gas, while further Gas Industry displays will be staged in other appropriate sections of the Exhibition.

## Gas Exhibition at Godalming

### Opened by Mayoress

A successful gas exhibition has just concluded at Godalming. This event was arranged by the Godalming Gas and Coke Company in conjunction with Richmonds Gas Stove Company, Ltd. (Radiation Ltd.), and was opened by Mrs. H. W. Fisk, the Mayoress of Godalming.

One of the Demonstrations in Progress.

Full particulars were sent to consumers in the district, inviting them to visit the exhibition and attend cookery demonstrations which were held each afternoon and evening for ten days. Over 700 people availed themselves of the opportunity of seeing what the Gas Company had to offer and of learning the advantages of "Regulo" controlled cooking. The demonstrations were undertaken by Miss R. Gilmour, of the Radiation Staff, and included several complete dinners cooked in the "New World" oven at one "Regulo" setting and time. The subsequent withdrawal of the complete meal cooked to perfection and "on time" never failed to win high approval.

Another popular feature was a cake-baking competition and the high standard set by 114 competitors made judging no easy task. The exhibition hall was attracttively set out with a comprehensive display of Richmonds "New World" cookers, High "Beam" fires, and water heaters, and good sales were maintained throughout the period of the exhibition.

## The Coal Bill

### Assurances by Central Council of Colliery Owners

A White Paper (H.M. Stationery Office, price 1d.) has been issued by the Secretary for Mines relating to the assurances given by the Central Council of Colliery Owners in connexion with the schemes for organized selling in the coal industry. The Paper reproduces a letter to Captain Crookshank, the Secretary for Mines, from Mr. W. A. Lee, Secretary of the Central Council, who stated that it appeared desirable to the Council that the assurances should be repeated, together with an indication of the meaning attached to them by the Council.

In the first place it was pointed out in the letter that it was not the practice of the sales control bodies to preclude consumers desiring to change their source of supply from doing so. Where a consumer desired to change his source of supply for a good and sufficient reason—other than reasons of price—the sales control bodies did not and would not place difficulties in the way of the issue of permits for the coal desired if it was available. In cases where consumers were attempting to set off one colliery against another in the matter of price, it was explained, steps must be taken to prevent this if the objects of the Coal Mines Schemes were to be carried out. The reference to change in source of supply was not intended to relate only to changes within a district.

Then, in all districts the Executive Boards would be prepared to meet representative bodies of consumers from time to time to discuss general questions appertaining to the supply of coal arising out of the selling schemes. The phrase "general questions appertaining to the supply of coal" was not intended to exclude general questions with regard to prices.

The letter continued to the effect that arrangements would be made in all districts whereby a purchaser would be enabled to refer to a Committee of Investigation a complaint in respect of any price that might be quoted to him. On this matter the Council understood that the Committees of Investigation could only deal with complaints in respect of acts or omissions under the schemes. Arrangements would therefore be made, under the machinery of the schemes, for any price quoted by a coal owner to be brought within the scope of the schemes and thus to be within the competence of the Committees of Investigation.

Where a purchaser lodged a complaint with a Committee of Investigation within a specified time of receiving a quotaton, the Committee of Investigation would deal with the matter within a reasonable time—to be specified—and meanwhile where the purchaser had given an undertaking to buy the coal whatever the finding of the Committee of Investigation might be, and to give any information which might be requested by the Committee, the sales control body would not issue permits for the disposal of the coal elsewhere to such extent as to deprive the purchaser of

the opportunity of making a contract. After the finding of the Committee of Investigation the sales control body would either confirm the permit already issued or amend its terms. A colliery would not be entitled to refuse to enter into a contract at the request of the purchaser on terms not less favourable than those of its original quotation provided that where the price originally quoted was one determined by the sales control body and the permit price was amended the price originally quoted would be amended accordingly.

These arrangements would only be possible where the purchaser had made a complaint to the Committee in sufficient time to allow coal to be reserved by the colliery and where no stoppage of a colliery was entailed by such reservation. It had already been provided that any price quoted by a coal owner might be referred to the appropriate Committee of Investigation and this assurance secured that (subject to the conditions specified in it) the coal would be reserved for the purchaser pending the hearing of a complaint by a Committee of Investigation.

Mr. Lee added two extracts from a letter sent to *The Times* on Dec. 21 last by Sir Evan Williams, as Chairman of the Central Council of Colliery Owners:

(*a*) "It is already the definite policy of the coalowners to endeavour to meet all reasonable requirements on the part of consumers both as to quantity and qualities."

(*b*) "'Undue preference' is neither the policy nor the practice of the Sales Control Bodies."

These assurances, the letter from Mr. Lee concluded, applied to all coal supplied for inland consumption or as bunkers at ports in Great Britain, and, so far as not in actual operation, were being brought into operation at once.

## National Cooker Fortnight in Birmingham

As part of the publicity scheme undertaken in connexion with National Gas Cooker Fortnight in Birmingham special cookery demonstrations and an interesting competition were arranged by the Birmingham Gas Department. The latter took the form of a "vote" on the order of importance of the various advantages of gas cooking. The Department drew attention to the competition by means of display windows and show cards in the branch showrooms and in a large number of contractors' windows.

Over a thousand ladies entered for the competition, and the result, as denoted by a scrutiny of the entry forms submitted, was as follows: 1, Reliability. 2, Economy. 3, Cleanliness. 4, Simplicity in Use. 5, Convenience. 6, Easy and Exact Heat Adjustment. 7, Automatic Oven Heat Control. 8, Quick Service.

The Lord Mayor of Birmingham Presenting the Prizes.

The two winners made only one error in their forecasts and each chose a gas cooker as the prize. The opportunity was taken to present the prizes at the opening of the National Trades Exhibition on March 14, when the Lord Mayor (Councillor E. R. Canning, J.P.) kindly agreed to make the presentations to the two successful ladies.

The display units and show cards were altered to show the result of the Competition and stated:

*Mr. Therm thanks the many hundreds of ladies who competed for their interest and enthusiasm, and is happy to know that "Reliability," characteristic of every aspect of gas service, is so highly valued in regard to gas cooking.*

## Summer School for Gas Fitting Teachers

The Summer School for Gas Fitting Teachers, which will be held at Watson House, Fulham, S.W. 6, from Monday, June 13, to Friday, June 17, inclusive, aims at giving all teachers concerned with gas fitting and ancilliary subjects an opportunity of keeping abreast of modern developments in the Gas Industry and of showing the best methods of technical instruction. Watson House is admirably suitable for this purpose, providing, in conjunction with the London County Council, facilities for the practical training of Westminster Technical Institute students.

Lectures will be given by experts in the Gas Industry and in Technical Education, and interesting works visits and demonstrations have been arranged. The course is to be opened by Mr. H. C. Smith, President of The Institution of Gas Engineers, who will give an Address on "Technical Training in the Gas Industry." The Director of the Course is Mr. J. H. Currie, Inspector of Technical Education, London County Council, who will be assisted by Mr. R. N. LeFevre, Officer-in-Charge of Training, Gas Light and Coke Company.

The following is the list of lectures to be presented:

| Lecturer. | Subject. |
|---|---|
| H. C. Smith, M.Inst.C.E., President of the Institution of Gas Engineers; Chief Engineer, Tottenham and District Gas Company. | Opening Address — Technical Training in the Gas Industry. |
| J. H. Currie, M.A., B.Sc., M.I.Mech.E., Inspector of Technical Education, London County Council. | Principles of Instruction. |
| G. N. Critchley, M.Sc., A.I.C., A.M.I.Chem.E., Technical Assistant to the Controller of Gas Sales, The Gas Light and Coke Company. | The London Building Act as Applied to Gas Installation Practice. |
| J. M. Grammer, A.M.I.H.V.E., Assistant to the Officer-in-Charge of Training, The Gas Light and Coke Company. | Theoretical Aspects of Gas Refrigerators. |
| E. W. Hobbs, B.A., Industrial Consultant to The Gas Light and Coke Company. | Personnel Selection. |
| R. N. LeFevre A.I.Mech.E., Officer-in-Charge of Training, The Gas Light and Coke Company; Assistant to Head of Department of Gas Engineering, L.C.C. Westminster Technical Institute. | (1) Teaching of Gas Fitting Theory.<br>(2) The City and Guilds Syllabus. |
| J. N. Long, D.Sc. (Eng.), M.I.M.E., Principal, The Westminster Technical Institute. | Teaching of Technical Drawing and Science to Gas Fitters. |
| F. A. Oliver, Superintendent of Supplies, The Metropolitan Water Board. | Regulations Governing the Installation of Gas Water Heaters. |
| H. G. Poore, Chief Workshop Instructor, The Gas Light and Coke Company, Watson House, (Training Centre). | Practical Aspects of Gas Refrigerators. |

The course is open to all teachers connected with Gas Fitting Courses in Technical Schools. Teachers who wish to attend should apply in the first instance to the Education Officer (H.4), The County Hall, Westminster Bridge, S.E. 1, for a form of application for admission. As the number is limited, early application is advisable. No fees will be payable by teachers engaged in London, Surrey, Kent, Middlesex, Essex, Bedford, Buckinghamshire, or Hertfordshire. A fee of one guinea will be charged to other teachers.

It is well to note that a similar course for gas fitting teachers is being held by the Board of Education in Birmingham during the week commencing July 4, and teachers interested who cannot attend the London Course should apply for admission to the Board of Education Course at Birmingham.

## National Benzole Company's New Tanker

The launching of a new coastal tanker for the transport of home-produced benzole motor spirit was carried out by the National Benzole Company at Rowhedge, near Colchester, on March 17. The new vessel has an overall length of 118 ft. and is fitted with Diesel engines which develop 280 b.h.p. at 450 r.p.m. The single screw propels the vessel at a speed of 8½ knots. The breadth of the tanker is 22 ft. 6 in. and its depth 10 ft., following a special design required by the owners to enable it to carry spirit up to their Exeter depôt. The ship will trade principally on the South Coast.

There is room for a cargo of 220 tons on a draught of approximately 9 ft. and this will be handled by a Diesel pump driven through reduction gear, which is capable of handling 100 tons of spirit per hour.

# Midland Association of Gas Engineers and Managers

The Annual General Meeting of the Midland Association of Gas Engineers and Managers was held at the Grand Hotel, Birmingham, on Thursday, March 24—the retiring PRESIDENT (Mr. H. Davies, of Chesterfield) occupying the chair at the outset.

The minutes of the previous meeting having been taken as read, the PRESIDENT referred with regret to the death of Sir John Ferguson Bell, of Derby, who had been a member of the Midland Association for 54 years, which was a long time in any man's life. He was President of the Association in 1900 and of The Institution of Gas Engineers in 1925. Those present stood for a moment in tribute to his memory.

Presenting the Annual Report and Statement of Accounts, the HON. SECRETARY (Mr. J. H. Paterson, of Ludlow) observed that these really spoke for themselves. The accounts had been duly audited, and the figures were very much the same as in previous years. Expenditure was slightly up as a result of the extra postages involved in the formation of the Midlands Coke Association. The balances on both general and emergency accounts had increased, and it was proposed to invest the surplus. In conclusion, Mr. Paterson urged members to co-operate in introducing new members to the Association and appealed for offers to read Papers at forthcoming meetings.

The resolution for the adoption of the Report and Accounts was proposed by Mr. P. LANGFORD (Coventry), seconded by Mr. G. C. PEARSON (Birmingham), and carried unanimously.

## The Commercial Section.

Mr. A. MACKAY (Stoke-on-Trent) moved, as Chairman, the Report of the Midland Commercial Section. There were still just a few members of the Association who had not yet joined the Commercial Section, and he hoped they would seriously consider the desirability of coming in. It would be agreed that during the past year the most serious matter had been the question of coal, and they found themselves in a less favourable position than that time twelve months ago. It was obvious, from the powers invested in the coal industry, that public utility undertakings would have to pay considerably more for their fuel than in the past—and he was afraid there was no redress. He would like, however, to give a little encouragement in connexion with the Committees of Investigation. These Committees were formed a year ago, and so far as his own district was concerned they had been successful in obtaining a reduction in the price originally quoted to the undertakings which appealed. Tar had improved, with the exception of pitch, the position of which was very bad. In conclusion, Mr. Mackay said that many undertakings had made use of the gas films which had been exhibited at one of their meetings.

The resolution for the adoption of the Report was seconded by Mr. R. S. RAMSDEN (Leamington) and unanimously approved.

## Education.

Mr. F. C. BRIGGS (Dudley) submitted his report on the work of the Midland District Education Committee, which, he said, continued to function in a useful manner. They had few meetings, most of the work being carried out by the officers. They received a number of enquiries from present and prospective students, the nature of which usually called for a prompt reply—which made it impracticable to call a meeting in every case. They had held one meeting to consider and criticize the examination questions. But considerable improvement had been achieved in the questions during the last few years, and he had not heard any criticism in recent times. The Committee continued to work quietly to the benefit of the Industry and the advantage of the student.

The PRESIDENT seconded the adoption of the Education Committee's Report, which was unanimously approved.

On the proposition of the President, it was unanimously agreed that Mr. F. Davies, the President-elect, be appointed to represent the Association on the Council of The Institution of Gas Engineers; and also on the proposition of the PRESIDENT, seconded by Mr. T. POULSON (Stafford), the following were appointed to represent the Association on the Midland District Education Committee—namely, Messrs. F. Davies (Walsall), C. F. W. Rendle (Redditch), F. C. Briggs (Dudley), and W. G. S. Cranmer (Willenhall).

The following were thereafter elected to membership of the Association and cordially welcomed by the PRESIDENT:

S. Brockbank (Walsall).
N. V. Somerville (Newent, Glos.).
J. E. Matlock (Ashby-de-la-Zouch).
H. Wilson (Beighton, nr. Sheffield).
T. T. Radford (Ross-on-Wye).
R. H. McGregor (Coalville).
J. K. Mitchell (Dudley).

## The New President.

The PRESIDENT said it was now his very pleasant duty to induct the new President. One always regretted the passing of time, but they could very safely leave things in the hands of their new President, who had a number of qualifications for the position. They could rest assured they would have a very interesting time under his Presidency. Mr. H. Davies wished Mr. F. Davies all success during his year of office and assured him of the support of every member. In inducting him, Mr. H. Davies was reminded that he was a very near relation. It was one of those exceptional happenings when a brother followed a brother in the Presidential chair.

On taking the chair and the Presidential badge, Mr. F. DAVIES first of all presented the Past-President's Badge to his brother, and, in doing so, he was reminded that it was over 34 years ago since Mr. H. Davies was responsible for his introduction to the Gas Industry; and during the early part of his career his brother had been his guiding star and had watched very carefully over him. Mr. H. Davies had instituted what had been the forerunners of the present correspondence classes. They would also wish him to express on their behalf their appreciation of all he had done during his year as President. He had been well-qualified to be their President, and the previous experience he gained as President of the Manchester District Association was of great value to their own Association. Nor must they forget the arduous work he had put in in connexion with the various Committees of the Association. He expressed their indebtedness to Mr. H. Davies for the manner in which he had carried out his duties—and they did not need to be reminded of the very happy time they spent at Chesterfield.

Mr. H. DAVIES thanked the President for the kind words he had expressed and the members for the way they had received them. It had been a great privilege to serve the Association, with which he had been connected for nineteen years and in whose work he had always taken the deepest interest. He voiced his personal thanks to the Hon. Secretary for the work he had done during his year of office, and he also thanked the Technical Press for the way they had helped the Association's proceedings during the past twelve months. He was sorry he had been unable to attend any of the meet-

ings of the Junior Association during the year and trusted that the new President would rectify this omission. Once again he thanked the members for the Past-President's Badge —which would remind him of a very pleasant year as their President.

The PRESIDENT extended a cordial welcome to Mr. E. Astbury (Chief Engineer of the Liverpool Gas Company and President of the Manchester District Association of Gas Engineers). He was a man who was universally respected and loved and they were very pleased to have him with them that day; they regarded it as a compliment to the Association. He also welcomed Alderman Dean (Chairman of the Walsall Gas Committee), who took a lively interest in the affairs of the Industry.

# PRESIDENTIAL ADDRESS

OF

## F. DAVIES, of Walsall

I must first express to you my appreciation for having honoured me with the post of President of the Midland Association. I think it is the first time in the history of the Association that brother has followed brother into the Presidential Chair, and naturally, for this reason, I feel very keenly my sense of responsibility in taking over the office.

I really believe that, in electing me as your President, you felt that you had had such good service from my brother that you felt justified in backing a horse from the same stable, and I shall endeavour during my year of office to see that you are not disappointed with your choice.

It becomes increasingly difficult from year to year, when one is called upon to fill an office which has been so worthily filled by so many distinguished Presidents, to find something new to say in one's Presidential Address, and I trust I will be pardoned if, on this occasion, I deviate somewhat from the generally accepted methods.

This Address will, more or less, take the form of speaking my thoughts aloud. I feel that I should like, in the first instance, to tell you something about myself.

I entered the Gas Industry in January, 1904. For some time prior to that I had been a long while making up my mind as to what profession I should engage in. I was determined upon something very practical. Chemical Engineering, Electrical Engineering, and the Medical profession were uppermost in my thoughts, when my brother suggested that all the young men who had entered the Gas Industry under the training of the late Isaac Carr, of Widnes, had done reasonably well. This seemed to clinch the position with my parents and after a preliminary period of three months I was duly articled to the late Isaac Carr, member of the Institution of Civil Engineers, Engineer and Manager to Widnes Corporation Gas and Water Departments.

### Looking Back.

Looking back on the training I received, I cannot help drawing a comparison between the facilities available for young people entering the profession in my early days and those existing to-day.

The Institution of Gas Engineers was, of course, an unchartered body and took little or no interest in the training of recruits to the Industry. There were no correspondence classes or properly regulated courses of study and we were, to a very large extent, expected to work out our own salvation, with, of course, the guidance and assistance we received from the chiefs to whom we were articled. We had to choose our own subjects and the usual examinations for which one entered were those provided by the City and Guilds of London Institute and the South Kensington School of Art and Science —a vastly different state of affairs from that prevailing to-day, and the change is all to the good.

I hope I shall be forgiven if I dwell a little on what I found at Widnes and the kind of training received there.

During that time, the name "Widnes" was a household word in the Gas Industry and was renowned throughout the world for selling the cheapest gas. Theories abounded at that time as to how this feat was accomplished. During the time I was at Widnes very little money of a capital nature was spent on the undertaking. Most of the work of reconstruction and extension to plant and machinery was carried out by contributions from revenue account. Slack coals were used, principally from Lancashire, with a small proportion from Yorkshire. No stoking machinery of any description was in use. The carbonizing plant consisted of hand stoked horizontal retorts. Widnes was a flourishing chemical industrial town and good shovelmen were easy to obtain, particularly as the rates of pay for spade workers in the Gas-Works were somewhat higher than those prevailing in the chemical works which surrounded us. The whole of the plans, designs, specifications, and quantities for new work was carried out at the Engineer's office, and the major portion of the extension and reconstruction work which went on from time to time was done by direct labour.

In those days we built our own retort houses, and the late Isaac Carr designed his own retort house benches and settings. We young people who were about him were expected to get out the quantities and assist in the supervision of the work. Very little work was left to contractors.

I remember a retort house being built where the whole of the work was performed by our own men, from the laying of the foundations, building the walls, fabrication and erection of the steel roof, the building of the bench and bench arches, regenerator furnaces, and retort settings. The retort and bench ironwork consisted of excellent second-hand material which was obtained on the dismantling of a large Works in Yorkshire, which all had to be altered on our own Works to suit the new conditions under which it was being used.

I have no figures of cost but I can assure you that everything was done in a most economical manner.

It was this keeping down of capital costs to an irreducible minimum, the wise buying of coal and the profitable disposal of residuals, which made it possible for Mr. Carr to sell gas at such figures, which at one time were as low as 11d. per 1,000 cu.ft. to ordinary consumers down to 9d. per 1,000 cu.ft. for industrial purposes, and 60 cu.ft. for 1d. through prepayment meters. A profitable residual in those days was, of course, sulphate of ammonia. Round about this time this product was bringing £28 10s. per ton at the Works.

Mr. Carr was a great believer in placing a definite limitation of the amount of profits taken from the Undertaking to the relief of rates. The gas for public lighting was given free, but as the net cost into holders was practically *nil*, this did not make any inroads into the surplus of the Undertaking's workings. Mr. Carr believed that any profits made by the Undertaking should be reserved for the use of the Undertaking.

It was such methods as these, briefly outlined, which lead to the position of Widnes supplying and producing the cheapest gas in the world. Indeed, I remember the time when the net cost of gas into holders was a *minus* quantity and the stock of gas in holders at the end of the year was a liability and not an asset. I pay my tribute after all these years to the outstanding ability of my first Chief, the late Isaac Carr, who knew what work was himself and saw to it that the young people who went to him understood well the meaning of that word.

### Good General Knowledge.

The young men of the Industry in those days were expected to have, and indeed, did possess, a reasonably good general knowledge of engineering practice as applied to gas-works. It was necessary, too, as the offices of draughtsman and chemist were usually associated with each other, to be able to draft out a reasonably good plan of the work in hand and to possess a general knowledge of routine chemistry. Most of the chemical laboratories in gas-works in those days were somewhat crude affairs compared with the up-to-date laboratory of to-day. Grains were the standard weights of measure and septems were used for volumetric analyses. The ultimate result of the test was obtained by multiplying by one figure and dividing by another, and it did not seem to matter very much whether you knew why or not, as long as the results were forthcoming. Calorimetry was not much practised, as

illuminating standards were then, more or less, prevailing throughout the whole of the Industry.

I had a lot of experience in photometry in those days as my then Chief, in his consulting capacity, was engaged by the opposition when turning over from the No. 1 Argand Burner to the Carpenters' No. 2, and sufficient could be said about the happenings of those days to almost constitute a presidential address in itself, but this, I think, is sufficient of history.

Such were the environments in which I found myself as a young man between the years of 1904 and 1910. In addition, however, to making ourselves familiar with the more practical sides of the Gas Industry, we were expected to get to know something of the commercial side of a gas undertaking's activities. The late Mr. Carr took the view, and rightly so, that young men entering the Industry with the hope of ultimately attaining executive positions, must know something of the ramifications of the general management, financial control, and commercial side of the business, and it is the lack of this that I am inclined to deplore in the general education of the rising young men in the Gas Industry to-day. I appreciate all that The Institution of Gas Engineers' Educational Scheme does for the rising technicians and I believe this to be all to the good, but I also believe that a large number of these young men will ultimately be called upon to fill executive positions and it is up to us, their seniors of to-day, to see that these young people have every facility placed in their way fully to understand and to obtain a full knowledge of the working of a gas undertaking, quite apart from the technical aspects. I have very strong views on this question, as experience has taught me that I could not possibly have handled the difficult situations which arose in my present Undertaking if my earlier training had been less thorough.

After serving with the Brighouse Corporation, Liverpool Corporation, and the Liverpool Gas Company, I came to Walsall as Deputy-Engineer and Manager in 1919, and on the retirement of my then Chief I was appointed to the position of Engineer and Manager. I propose to take a little of your time to deal with a few questions on Gas administration that are not usually associated with a Presidential Address.

Let me say at once that the Walsall Undertaking had been shockingly administered from a financial point of view, and I am going, very frankly, to tell you what, in my opinion, were the faults of that administration.

## A Milch Cow.

First of all, I must tell you why and how those faults arose. In the main, they were due to looking upon the Gas Undertaking as a milch cow and to take from the Undertaking's earnings as much as it was possible to take to the relief of the general rates, regardless of its present and future earning capacity or of its future requirements. This became almost a fetish which lead to practices deserving nothing but the strongest condemnation. Past Borough Treasurers were in the main responsible. When I took control at Walsall it was the practice to purchase meters, cookers, and all gas appliances both for simple hire and free service to slot consumers out of revenue, which, on the face of it, seems a very commendable practice; but when those purchases were returned to stock at the end of the year without proper and adequate depreciation, and when those practices had been going on over an extended number of years, you can imagine the position into which the Undertaking drifted. There was an item of almost £49,000 as stock in the books of the Undertaking which ought to have been written off long years ago, and it has been one of my jobs to provide the money for the writing down of that stock. Money was borrowed for Gas-Works' purposes for periods of loan far in excess of the possible or probable life of the asset. The result has been that we have been burdened with overhead charges on plant which years ago ceased to function. Those of you who are in charge of Municipal Undertakings will appreciate that when calculating the annual contribution to the sinking fund, consideration has to be given to the earnings of that fund during the period you are contributing to it, to arrive at what your annual contribution shall be, so that at the end of the loan period you have contributed neither more nor less than is exactly required to redeem the debt. As the earnings of this Fund may vary, it is wisely provided in law that interest shall be assumed at 3%. It is further laid down that when the income from the sinking fund is in excess of this 3%, the excess earnings shall be used for (*a*) reducing the annual payments made to the fund, or (*b*) accelerating the redemption of debt.

It is also provided that where the earnings of the invested sinking fund shall fall short of the 3%, that the difference shall be a charge on the revenue account of the undertaking.

Indeed, the earnings on the Gas-Works' Sinking Fund for many years exceeded 3%, but the excess earnings were never used for either of the two purposes I have outlined, but were kept in a suspense fund which, from time to time, was drawn upon to assist the rates of the Borough—a most iniquitous way of administering the finances of a municipally-owned undertaking.

These unstable methods of finance have their repercussions in another important direction. I refer to that of rating assessment. I need hardly say that rating assessment of a municipally-owned gas undertaking is based upon what a hypothetical tenant could afford to pay as rent and at the same time make a reasonable profit on the money he would be expected to invest in the concern. The first figure which forms the basis of the assessment is the balance of revenue which consists of the whole of the revenue of the undertaking *less* permissible working expenses and certain statutory deductions. It necessarily follows that where the balance of revenue figure is high the assessment will be high also.

Such happenings which took place in Walsall years ago undoubtedly caused this balance of revenue figure to be out of proportion to other undertakings of about the same size. It seems to me to be fundamentally wrong in principle that such a state of affairs should exist that, the higher the outstanding debt on an undertaking, the higher that undertaking will be assessed for rating purposes. The unfortunate consumer in that case is having to meet, through his gas account, the heavy net revenue expenditure by way of interest and sinking fund charges and the higher ordinary revenue expenditure in the form of rates. It seems a Gilbertian position that a municipally-owned trading undertaking should be of more benefit to the rates when it is overloaded with debt, especially when that debt has been allowed to accumulate by reason of mistaken financial policy adopted within the undertaking so many years ago.

The same argument can also be used against a fixed percentage on outstanding debt being annually taken from the undertaking in aid of local rates.

## A Believer in Public Ownership.

I hope I have not pictured to you too gloomy a story, and I further hope that the remarks I have made on these general financial matters have not led you to believe that I am against public ownership of utility undertakings. This was far from my intention. I am, and always have been, a very definite believer in public ownership of such trading undertakings, which, when properly administered, can pass on great benefits to the community, and it is only when such a financial policy as I have outlined is recommended by the type of financial official whose main aim and consideration is the Borough Fund, that the danger is present.

However, those days have gone by and the practices no longer prevail and we are now getting a straight deal.

## A Beacon of Warning.

I have mentioned these matters hoping that they may serve as a beacon of warning, particularly to the younger of our members, that they may look into these things to make sure that their own undertakings do not suffer likewise.

I do not intend to-day to trouble you with the history of the Walsall Undertaking. Suffice it to say that it had its advent in the year 1824, when an Act of Parliament was obtained by the town granting powers of public lighting by means of gas and pursuant of this Act a gas-works was established in Lichfield Street in the year 1826. These Works continued to supply gas to the township until 1848, when the new Works in Wolverhampton Street were built and continued to make the town's requirements until the Walsall Gas Purchase and Borough Extensions Act of 1876 was obtained, and under those powers the present Gas-Works at the Pleck were constructed and in 1895 the old Gas-Works at Wolver-

hampton Street were shut down and dismantled. Only a portion was left in use as a distribution station.

You will see from this that the Walsall Undertaking is a very old one—one of the oldest in the Midlands. The site was well chosen but badly applied. The Works are on both canal and railway. For some obscure reason, when the Works at Pleck were developed owing to increasing consumption, these developments took the form of constructing two Works on the one site as far as the dry purification plant. After that the Works became one. It is difficult to imagine why such a procedure was adopted as none of the ancillary plant up to the purifiers was capable of being used as a stand-by to the other and one of my first considerations was to do away with that state of affairs. This was a simple matter and only one of mainlaying.

The purifiers themselves, while of ample capacity, were badly arranged. They consisted of two sets of four boxes, each set arranged to work on backward or forward rotations. The connexions of these boxes were in series, which meant that the last four could only be used as catch boxes, which placed a very serious limitation on the capacity of the whole installation. I decided to split these eight boxes into two sections of four, each set retaining the original facility for backward or forward rotation, and to install a pre-heater on the inlet to each set and at the same time to erect two catch boxes to deal with the carry-over from each installation at the time of making the change. By this means and at very little cost we more than doubled the purifying capacity of the plant and in this respect we are in a safe position for many years to come. Part of the original water-sealed purifiers, consisting of six boxes, have been retained and serve as purifiers for the carburetted water gas plant.

When our No. 4 gasholder was re-constructed, throwing a pressure in the bottom lift of 15 in. as against 5¼ in. in the old holder, it was found imperative to replace the water seals with dry seals. This was simply accomplished with the satisfactory result that we are able to deal with upwards of 80,000 cu.ft. of gas per hour against the maximum we could deal with before the alteration of 23,000 per hour owing to the danger of blowing the water lutes.

Up to the year 1920, the whole of the gas was made in horizontal retorts, stoked by a de Brouwer stoking machine and Wests' pneumatic scoop machines, and carburetted water gas plant. The year 1920 saw the first vertical retorts in Walsall. These consisted of 20 five-ton ovens, having a nominal capacity of 1¼ million cu.ft. of gas per day. In 1925, I installed a range of horizontal retorts with coal-handling plant, overhead storage hoppers, de Brouwer stoking machinery, and telpher coke handling plant. About five years ago it was apparent that the vertical retort installation would, in the very near future, have to be reconstructed, as it had then had twelve years' continuous use, with the exception of one period when the settings were rebuilt. A sum of £5,000 a year had been set aside for the purpose of assisting this reconstruction. Two years later, in 1935, it was decided that if the town's supply were not to be jeopardized, reconstruction or rebuilding must take place.

I was faced with a difficulty and a serious one, in so far as the horizontal plant available together with the water gas would be sufficient and that only with very careful supervision, to carry us over the six light months of the year.

## New Vertical Retort Installation.

This led me to consider the advisability of building a new vertical installation paralleling the old and to reconstruct the old installation at a later date. The decision had to be made and had to be made fairly quickly. After going into the pros and cons with the greatest possible care, I decided that providing the work of pulling down the old installation and the building of the new one could be carried out within the six months period we should proceed with the reconstruction. There were a lot of preliminary details to settle. I was desirous of embodying in the reconstruction a thoroughly up-to-date and entirely dependable coal-handling installation and at the same time I was equally anxious to retain the existing coal-handling plant as a stand-by to the new installation. There was only one place at which the coal could be taken from our sidings and, as this railway ran parallel with the retort house, it was necessary to turn the corner with the coal on its journey to the overhead storage hoppers. I was determined also that with this coal-handling plant as much as possible should be above ground level. Deep breaker pits were both expensive to install and the machinery contained therein expensive of maintenance. To arrive as near as possible to the conditions at which I was aiming, it was decided to install a side waggon tipper which gave the coal a lift prior to tipping. It was further decided to take advantage of the fact that we had to turn the corner with our coal to take the feed direct from the first receiving hopper attached to this tipper *via* a band conveyor with automatic feed and to carry the coal to a sufficient height to feed the coal breaker and from there to another of the conveyors which fed into the boot of a roller chain bucket elevator. By this means we were able to keep the whole of our machinery either above ground or at such a distance below ground as to be easily accessible for repairs and maintenance.

The old vertical carbonizing plant was dismantled and in place of the twenty 52 in. retorts thirty 62 in. were installed and five outside producers—four of which are of sufficient capacity to provide all the producer gas required for the heating of the whole installation. The original installation of twenty retorts contained inside producers and regenerators and were downwardly heated. In the new installation, which is upwardly heated, in place of the regenerators, two fire tube waste heat boilers were installed, having an evaporation capacity of 9,200 lb. per hour. Either of these boilers is capable of providing practically the whole of the steam requirements of the works.

Both of these boilers are fitted with augmentation flues to enable the steam to be raised in excess of that normally provided by the waste heat from the installation. We have found this to be extremely convenient for occasional use but from the experience we have had in Walsall, it is not to be recommended as a general practice on the grounds of cost.

The coal we carbonize in Walsall consist of practically wholely Derbyshire coal, Derbyshire being the nearest coalfields from which gas-making coals, on which the lowest railway rate is paid to our Works, may be obtained. This coal works excellently in vertical retorts. The coke produced from Derbyshire coals is certainly smaller than the majority of well-known gas coals but as the demand in our area is for small coke rather than large, what may conceivably be a disadvantage in other towns is a decided advantage in Walsall.

It is not my intention to burden my hearers with a lot of statistical information, suffice it to say that the reconstructed installation has a capacity of 3,650,000 cu.ft. of 450 B.Th.U. gas per day and the whole cost of the installation was £41,073, £26,000 of which was provided out of the revenue account of the Undertaking.

## Coke Handling and Grading.

Having decided upon bringing our manufacturing plant thoroughly up-to-date, attention was also given to the question of coke handling, which up to that time was somewhat crude, expensive, and wasteful. I decided that in the future we should supply to the coke-consuming public nothing but properly screened and graded fuel. With this object in view a site was found for the new installation, bearing in mind its suitability for the handling of coke required to be carried by canal, rail, and road vehicles. Careful consideration was given to the question as to how the coke should be transported to the site of its final handling. It was decided that the most economical method of dealing with this was by an extension of the existing telpher track. As the height of this track was such that it precluded us from putting coke direct on to the screens from telpher skip, it was decided to deal with this *via* a preliminary hopper having sufficient capacity to contain a week-end's make of coke (approximately 100 tons) so as to make it unnecessary to work the screening plant over the week-end. As I previously intimated, I wanted the new plant to be comprehensive in its character and of such a size that would meet the requirements of the Undertaking for many years to come. Ferro-concrete bunkers were decided upon having a total storage capacity of approximately 400 tons.

By reason of its lack of height three outlets had to be provided with automatic feeds on the preliminary storage hopper. This consisted of a simple endless belt feed depositing the coke on to a rubber band conveyor. From the end of this conveyor the coke is carried *via* a rotary filler to the gravity

bucket elevator, which conveyed it on its first stage to the top of the screening house.

The greatest care was exercised in the design of this plant to see that the coke was handled as gently as possible. This particularly in view of the fact that Derbyshire coke is somewhat of a friable nature, and I think we have been particularly successful in this direction. At no portion of the coke's travel from the telpher skip to the first chute on to the scalping screen is it subjected to unreasonable shock.

Provision was made at this point to deal with the coke either through a coke-cutting machine or direct on to the screens. The screens are of a reciprocating conveyor type and have given every satisfaction and the maintenance has been surprisingly low, particularly in view of the fact that the whole of the Undertaking's make of coke passes these screens, the first of which consists of a scalping screen, all over 2 in. passing over to the two large coke bunkers provided with spiral chutes to the base of the hopper. The scalped coke then passes by means of the conveyor screens and is graded into the two hoppers at the end of the screen, each provided with a spiral chute.

It was not considered necessary to install spiral chutes dealing with the smaller sizes of coke as it was believed that these would stand the shock of dropping from the screens into the bunkers without undue damage. In practice, we have found this to be very definitely the case.

## Debreezing.

At the outlet of these hoppers are provided four portable debreezers, two running each side of the hoppers, the ones on the canal side debreezing the coke on its way to canal barges or railway trucks and the two on the opposite side deal with the coke delivered into road vehicles. An extension of the telpher track was carried paralleling these bunkers which gave us a two-way traffic system, facilitating the removal of coke from the installation into stock if needs must, as well as bringing the untreated coke from the retort house to the installation. These facilities would have been difficult to obtain by any other means than a telpher.

The whole of this plant is electrically driven and the control is by press-button. This power installation is interesting in so far as it provides for the whole of the motors to be started up in a pre-determined order. It also provides that should a motor fail, all motors operating the plant in front of the failure will automatically stop and allow the rest of the motors to continue running to clear the plant of coke. This mechanism is entirely automatic in its action and has functioned perfectly since its installation.

## Sales and Distribution.

A presidential address would be incomplete these days if some mention was not made of the gas sales and distribution sides of the Undertaking, and I propose to deal very briefly with both. Building development in Walsall, in common with most other towns, has taken place on the outskirts of the Borough and as our mains in these areas were of comparatively small dimensions and inadequate to meet the new demands, something had to be done about it. Ripping up of main roads in the centre of the town for the purpose of laying new trunk mains was unthinkable and I decided that the best way of getting an even gas pressure throughout the whole of the area was to take gas out from the Works on to the fringe of our area and feed back into the centre of the town.

We were fortunate in this respect as a new ring road was created round the southern end of the Borough. We were able, while this road was being constructed, to equip it with 18 in. mains direct from the Works and so feed back as previously outlined into the centre of our area, and, at the same time provide adequate capacity mains from which to supply the rapidly developing areas on the extremity of our district. On the northern end of the Borough we were not so fortunate as mains had to be laid in existing streets and roads. A 12 in. main was taken from our Wolverhampton Street Distributing Station to almost the extremity of this northern district and, like the main on the ring road, fed back into the centre of our area and provided for developments which were taking place at the extreme part of this area.

The rapid developments which were taking place on the Walsall-Birmingham Road, consisting of fairly large housing estates, brought in its train another problem. The gas supply in this district had not been altogether adequate some time before the area was developed and I decided to take the bull by the horns and go right over to high-pressure distribution in order to satisfy the wants of the district in question and provide for a gas supply to a large housing estate which will shortly be embarked upon, having upwards of 3,400 houses, within our area of supply. Two 100,000 cu.ft. per hour compressors were installed, feeding an 8 in. high-pressure main at varying pressure up to 40 lb. per sq.in. with Renolds type district governors at the point where this gas enters into the existing low-pressure system.

The route chosen for this main will permit us at a later date to extend it round the whole of the remaining portion of our outlying area and this extension will be carried out in the very near future and when completed will, I believe, solve our distribution problems for many years. We shall, thus, have practically the whole of the extremities of our area covered by large capacity either low- or high-pressure mains and what we have been trying to do will, I believe, have been accomplished.

An adequate supply of gas at a reasonable pressure and of constant quality is the first essential to promote gas sales, and no amount of energy put into this question will be of any avail unless these first conditions are complied with. I believe, myself, that this is almost as important from the domestic consumer's point of view as a low price for gas. We have endeavoured in Walsall to build up among our consumers a reputation for quick and efficient service, high quality of work carried out by our fittings staff, and in this connexion we have for many years now been extremely careful as to the type of youth who is recruited into the Department for this work. They are all engaged with us for a probationary period to attempt to ascertain if their natural inclination is towards this class of work. They also have an afternoon off per week to attend specially designed day classes with a view to continuing and enlarging upon the education they received while at school. The subjects taken are drawing and calculation and elementary science.

The classes are designed to widen the youth's outlook and help him to realize that there is something waiting ahead a little better than carrying a fitter's bag. We have found this to be all to the good.

## Showrooms.

Some years ago we decided to erect new central gas showroom premises, properly staffed with competent salesmen, and it is from this central department that most of our sales activities radiate. We have recently made an addition in the form of a very excellent demonstration room, equipped on modern lines, and we have now the services of a lady demonstrator who gives twice weekly demonstrations of cookery, laundrywork, and the general use of gas appliances in the home. We have found these to be reasonably well attended. We also make arrangements with the various women's organizations in the town to attend lectures on special days set apart and more often than not they are allowed to choose the subject of the discourse.

We have found that excellent use can be made of these existing audiences. It is also our intention in the very near future to arrange with the Medical Officer of Health to provide us with audiences from the various clinics of the town to give demonstrations to the poorer section of the community how economical and nourishing meals can be prepared by means of gas.

Our area, in Walsall, is a very scattered one and there is not sufficient population outside the Borough boundary to warrant branch showrooms. We have, however, a small branch showroom at the northern end of the Borough for the convenience of residents in this area but this is only a small affair and no demonstrations take place there.

In order that better use, therefore, should be made of the central premises, we arrange for free transport to consumers in outlying districts to attend demonstrations in Walsall. I think that, in our area, this is both more economical and satisfactory than attempting to take the showroom into these outlying districts.

What has probably given us in Walsall the greatest knock is slum clearance. Practically the whole of the condemned houses in Walsall used gas exclusively for lighting and cooking. The old tumbledown kitchen grates were quite unsuited

for any form of cooking. These people are now, fortunately, being re-housed in better houses and brighter environments. All of the new houses, however, are electrically lighted. For this reason our lighting load has suffered a fairly large setback. What, however, has hit us more than anything lies in the fact that quite a considerable number of these people have been re-housed on housing sites which, although within the boundaries of the Borough, happen to be outside our area of supply. The area belonging to a neighbouring undertaking was purchased in 1875 from the Birmingham Staffordshire Gas Light and Coke Company.

Our latest effort to promote gas sales has been the appointment of an Industrial Gas Salesman and our linking up with the Midland Industrial Development Centre, and in the short period of our activities in this direction I am very definitely of the opinion that great good will come of it to the benefit of the Undertaking and also the people we serve.

This brings me to the question of the difficulty of getting suitably trained men for this work of industrial gas salesmen and I am surprised that more young men within the Industry are not equipping themselves to fill such positions. I am satisfied that there is an urgent need for this type of technician and that the need in the future will be even greater than it is to-day.

Walsall is a town of many trades and activities. We have not, however, many industries which may be looked upon as potential large gas consumers. It is surprising, however, when once you get going on the subject of industrial gas sales, the amount of business which can be done which was not apparent until the work was thoroughly tackled.

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### Vote of Thanks.

Mr. G. DIXON (Nottingham) proposed a hearty vote of thanks to Mr. Davies for his Address, recalling that he had been connected with the President before most of them in that room. Mr. Dixon had found him at Widnes, where Mr. Davies had taken charge of him, and it was a pleasure to feel that for the next twelve months he was again going to serve under him as President of that Association. He offered Mr. Davies his congratulations on coming into the chair of that Association, in doing which he had earned nothing that was not due to him. His Address was one of the most interesting he had ever heard, and had reminded him of all sorts of activities at Widnes which he had almost forgotten. He remembered Mr. Isaac Carr saying something to them which stuck in his memory, and in which there was a tremendous amount of truth—though many technical people would not take it all the way. Mr. Isaac Carr's great point was that gas engineering was common-sense applied to material. There was a great deal of homely truth in that—and he had always tried to follow it out. Mr. Davies had said that the Address was something in the nature of thinking aloud. This was typical of their President (who used to do a great deal of thinking aloud!). It was typical of him because he always used to be looking for things that were wrong and always tried to gain from them experience which he could pass on to others. People in the Gas Industry to-day, said Mr. Dixon, would be very much better off if they sometimes tried to forget the glory of their positions at the moment and pointed out all the things they had done wrong. That was one of the outstanding points in Mr. Davies' Address, on which they should congratulate him for striking a new note in Presidential Addresses, which was a very difficult thing to-day. They were living in days when competition was becoming keener and keener, and they must have live men in the position of Presidents of their Associations in order that they might train the younger men to meet the conditions that would come. In Mr. Davies they had one well qualified for that purpose. They owed him a debt of gratitude for his very interesting Address.

Mr. F. C. BRIGGS (Dudley) seconded the vote of thanks and congratulated the President on his courage in presenting an autobiography in his Address; most of them would not have had the courage to do so. He also congratulated Mr. Davies on his courage in so cogently criticizing his own undertaking before he took charge. It was interesting to hear what he had to say about Widnes and Mr. Isaac Carr—and that the Carr flag was still flying; it was interesting to hear that gas in Widnes was still so cheap; and it was interesting to think how such an engineer would have tackled the problems of to-day and still kept the capital costs down. Another important point mentioned by Mr. Davies was executive training—a matter to which they had not given a great deal of attention. The men who became Engineers and Managers went as pupils to gas-works where executive training was negligible. Mr. Davies had shown that he could not have carried his responsibilities without such training. Mr. Briggs' own career commenced outside the Gas Industry—in ordinary business—and the training he received there had been invaluable. He did not agree with those who said they could not see a future for many men in the Industry to-day because of the advent of Holding Groups. He thought the coming of the big groups was inevitable, but it still called for men of specialized capacity. They must therefore consider executive training as opposed to technical ability.

The vote of thanks was carried by acclamation, and the PRESIDENT briefly acknowledged it.

Mr. E. ASTBURY thanked the Association for their kind invitation to be present at their meeting. It was a very great pleasure to him to be there—in fact, he might term it a triple pleasure: First, to be present at the induction of their new President, who had previously been with the Liverpool Gas Company (and they were very sorry when he left for Walsall). Mr. Astbury was delighted to hear that the Midland Association were showing their appreciation of Mr. Davies' work by making him their President. He congratulated him and hoped and trusted his year of office would be a happy and successful one. Secondly, it was his privilege to convey greetings from the Manchester District Association—as their President it gave him great pleasure to do so; and, thirdly, he was very pleased to be in Birmingham once more and to have the opportunity of meeting a number of old friends.

Alderman DEAN (Chairman of the Walsall Gas Committee) said it had been a pleasure to him to be present at their meeting to see the induction of their Gas Engineer as President of the Association. All the members of the Gas Committee and, indeed, of the Council were proud of the honour which had been done Mr. Davies because he was well loved by everyone connected with the Gas Undertaking at Walsall. He had told them of the condition of things as he found them in Walsall; and he had put them right. There was no question about that. He had entirely modernized the plant so that people who were despondent about the prospects of the undertaking now had full hopes for its future. They were proud that he had been elected President, and hoped it would be a very happy and profitable year for him. In conclusion, Alderman Dean extended an invitation to the Association to visit Walsall for their Spring Meeting on May 26, when they would be able to see the work that Mr. Davies had described to them.

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## Empire Exhibition, Glasgow

The Council of the British Gas Federation are impressed with the desirability of organizing a visit of members of the Federation to the Empire Exhibition at Glasgow, and it has been ascertained that a suitable time for this visit would be June 22 and 23, 1938.

The Gas Industry will be represented at the Exhibition by—

(1) A Gas Pavilion, which will deal with the domestic and commercial uses of gas.
(2) An Industrial Gas Exhibit in the Palace of Engineering.
(3) An Exhibit demonstrating the Manufacture and Utilization of Gas (with special emphasis on its by-products) in the Coal Pavilion. This Exhibit is being organized in conjunction with the D.S.I.R.
(4) A Kitchen Planning Exhibit presented by the Women's Gas Council in the Women of the Empire Pavilion.
(5) An Exhibit by the Glasgow Corporation Gas Department in the Glasgow Pavilion.

The Exhibition is the largest of its kind to be held in this country since the Empire Exhibition at Wembley, and is an Exhibition supported by the British Government, the Dominions, and the Colonies.

An official Luncheon of the B.G.F. will be presided over by Sir David Milne-Watson, Bart., on June 22, and prominent representatives of the Government and Industry in Scotland will be invited.

The dates of the visit fall within the period of the International Engineering Congress, Glasgow, in which the principal Engineering Institutions, including The Institution of Gas Engineers, are co-operating. Of the various Addresses two will deal with matters relating to the Gas Industry—one by Sir David Milne-Watson. Visits to Works are also being arranged in connexion with the Congress.

Membership of the Congress will be open to members of the B.G.F. on payment of an inclusive fee of £2 5s. by each member and £1 15s. for an accompanying lady. Membership of the Congress will cover attendance at the Technical Sessions, excursions, receptions, and Volume of Proceedings for each member.

Application should be forwarded, together with remittance, to the Hon. General Secretary, International Engineering Congress, 39, Elmbank Crescent, Glasgow, C 2. Members who are unable to participate in all the proceedings will be admitted to the Gas Addresses without payment of the Congress fee.

# The Southern Association of Gas Engineers and Managers

The Annual General Meeting of the Southern Association of Gas Engineers and Managers was held at the Hotel Victoria, Northumberland Avenue, W.C. 2, on Friday, March 25—the PRESIDENT (Mr. D. C. Cross, Engineer and General Manager of the Lea Bridge District Gas Company) presiding.

The minutes of the previous meeting, as published in the "GAS JOURNAL," were taken as read and confirmed, after which the PRESIDENT referred with regret to the death of one of their members—Mr. R. W. Edwards—in whom they had lost a well-known and esteemed friend. Those present stood for a moment in tribute to his memory.

On the proposition of the PRESIDENT, seconded by Mr. S. E. WHITEHEAD (Southampton), the Report of the Committee was unanimously adopted.

## New Members.

On the proposition of the PRESIDENT, seconded by Mr. F. BLACKBURN (Devonport), the following were unanimously elected to membership of the Association and were cordially welcomed by Mr. Cross—namely,

W. Storey (Barnet).
R. G. H. Clark (Dover).
B. W. Dawkins (Gas Light and Coke).
H. W. Moys (Gas Light and Coke).
C. Dunn (Wells).
R. N. LeFevre (Gas Light and Coke).
W. S. Stredwick (Bournemouth).

It was proposed by the PRESIDENT, seconded by Mr. R. J. H. CLARK (Plymouth), and unanimously agreed that two names be put forward to represent the Association on the Council of The Institution of Gas Engineers—namely, Mr. S. E. Whitehead and, in case of his inability to attend, Mr. W. Grogono (Croydon).

## Presentation to Retiring President.

The PRESIDENT then made a presentation of a silver salver to Mr. S. E. Whitehead, the retiring President, as a mark of the esteem and respect in which he was held by the members of the Association and for what he had done for them during his year of office. The President referred to Mr. Whitehead as "one of the younger generation" and said that he had before him a very brilliant career. Indeed, he was so highly esteemed at Southampton that the Directors honoured him by electing him to the Board in order to ensure the retention of his services. That action spoke for itself. His Chairman, Sir Russell Bencraft, had been with them a year ago and had spoken of Mr. Whitehead in the most glowing terms; they knew what they felt of him at Southampton. It only remained for Mr. Cross to say that the members of the Association felt as Sir Russell Bencraft did. They thanked him for the manner in which he had carried out his year of office; he had maintained the traditions of that office in every way; he had thrown himself with enthusiasm into everything the Gas Industry was doing, and they thanked him most heartily for what he had done for the Association, in recognition of which they asked him to accept this small memento.

Mr. WHITEHEAD, in acknowledging the presentation, said he very much appreciated the very kind remarks that had been made concerning what he had been able to do for the Association. The last year had been a very happy one for him, and although he had accepted the Presidency with the same diffidence that Mr. Cross himself had shown he had had a very happy year thanks to the support of all the members. He would also like to pay tribute to the great help which the Hon. Secretary (Mr. W. A. Howie) had rendered; he was a tower of strength to the President. He thanked them very sincerely for the memento, which he would always treasure as a reminder of a very happy year as their President.

Mr. CROSS then presented his Presidential Address, which will be found on other pages of this week's issue.

The meeting concluded with a reminder by the PRESIDENT of the forthcoming Summer Meeting on June 24. It was proposed to visit the Lea Bridge Gas-Works in the morning, where they would have lunch, and in the afternoon they hoped to go to Hatfield House, the residence of the Marquess of Salisbury. They were grateful to Mr. H. C. Smith for his assistance in arranging this visit, and a cordial invitation was extended to ladies to accompany them on that occasion.

## THE ASSOCIATION LUNCHEON.

Prior to the meeting, the Association gathered at luncheon at the Hotel Victoria, when the PRESIDENT presided over an excellent attendance of members and distinguished guests.

In proposing the Toast of "The Guests," Mr. F. BLACKBURN (Vice-President) referred with pleasure to the presence of Mr. E. Astbury (President of the Manchester District Association of Gas Engineers) and congratulated him on his appointment as Chief Engineer of the Liverpool Gas Company. He also welcomed Mr. H. C. Smith (President of The Institution of Gas Engineers), Mr. W. A. Damon (Chief Inspector of Alkali Works), and representatives of the National Bodies from Gas Industry House. He thanked them for their presence and coupled with the Toast the names of Mr. E. L. Burton (Deputy-Chairman of the Lea Bridge Gas Company) and Mr. Damon.

Responding to the Toast, Mr. E. L. BURTON apologized for the absence of his Chairman, Mr. A. M. Paddon. Mr. Paddon was a man fully conversant with the Gas Industry from beginning to end, and was one of the most accomplished members of the Industry with whom he had had to deal—and he had had to deal with a good many. Mr. Cross was Engineer and General Manager of the Lea Bridge District Gas Company. But he was more than that; he was the friend of every employee in the Company's service and the valued friend of every member of the Board. They highly esteemed Mr. Cross and valued his services. He hoped they would take the opportunity of visiting the Lea Bridge Works where they would see what Mr. Cross—following in his father's footsteps—had accomplished. When Mr. Burton first became associated with the Lea Bridge Company it was a very small company. With the coming of Mr. Cross's father began the development of the undertaking, and much of the present success of the Company was due to him. He was followed by Mr. D. C. Cross, who brought the Works to a state of efficiency second to none. They were very well satisfied and more than satisfied with Mr. Cross's management, and they hoped he would be their Engineer-in-Charge for many years to come. In the name of the Directors, Mr. Burton invited the Association to visit the Company's Works on June 24, and the Board would be delighted if the members would be their guests on that occasion, and he hoped it would be a happy gathering. In conclusion, Mr. Burton thanked the Association on behalf of the guests for their hospitality.

Mr. E. ASTBURY associated himself with Mr. Burton in replying to the Toast, and he took the opportunity of thanking the Association for the manner in which they had received the reference to his appointment as Chief Engineer at Liverpool, though in doing so he spoke with great regret of the loss of Mr. Gibson, who had always been ready to give every assistance to members of the staff. He paid tribute to his memory. It was a great pleasure to be there that day to hear Mr. Cross's Presidential Address. The name of Cross was well-known and honoured in the Gas Industry, and he hoped he would have a very happy and prosperous year and that the Association would continue to progress under his Presidency. In conclusion, Mr. Astbury conveyed to the Association the hearty greetings of the members of the Manchester District Association.

The PRESIDENT thanked Mr. Astbury for his remarks and reciprocated his greetings to the Manchester District Association

and also extended them to the Junior Associations represented on that occasion.

### "The Association."

Mr. H. C. SMITH proposed the Toast of "The Southern Association," and on behalf of The Institution of Gas Engineers he acknowledged the very valuable work which was done by the District Associations, not least of which was the Southern Association. He expressed appreciation of the Southern Association's contributions to the Institution Benevolent Fund. The District Associations fulfilled an important part in the national affairs of the Gas Industry. There was no industry in this country which got together as they did in the Gas Industry; in spite of their National Bodies there was still a place for the District Associations, and the Southern Association had taken a considerable part in the activities of the Institution. It was due to their efforts that the Institution altered their rules to enable the admission of the contracting and appliance manufacturing sides. They were also responsible for setting up the educational qualifications for membership. It was also the Southern Association who played an important part in the formation of the London and Counties Coke Association. Their Association was founded in 1875, and they had a noteworthy list of eminent past-presidents, of whom he mentioned a few, including such names as Livesey, Carpenter, Broadberry, Corbet Woodall, Price, Doig Gibb, and Thomas Hardie. From an original membership of 18, they had grown to 337, which did not look as if they were engaged in a dying Industry. Mr. Smith coupled with the Toast the name of their President, in whom they had one who would follow in his father's footsteps and would make an excellent President.

The PRESIDENT, in responding to the Toast, expressed appreciation of the kind words which had been spoken. He also thanked Mr. Burton for coming there at great inconvenience. He should be very proud of that day, because he was following his father who was President of the Association exactly 32 years ago. In addition, his grandfather had been Engineer and Manager at Abergavenny. He thanked the Association for their support and the guests for their presence. Mr. Smith had given him some qualms by quoting the names of the honoured Presidents who had preceded him in the Chair. They had been passing through difficult times lately, but it remained for the Association to work together for the better times which lay before them.

# The Development of By-Product Coking

by
G. W. J. BRADLEY, F.I.C.,
President of the Coke Oven Managers' Association,
and
G. E. FOXWELL, D.Sc., F.Inst.P., F.Inst.F.

From a Paper delivered at a meeting of the Institute of Fuel on March 17.

Since the market for blast furnace coke is now restricted, colliery-owned coking plants make largely for what is at present termed the gas coke market, and it is expected that in time this practice will increase. It is possible to displace some 30 million tons of house coal by smokeless fuel, as well as to find outlets for coke in established minor industries and in ways not yet discovered. By cultivating the gas coke market, in collaboration with the Gas Industry, it will be possible for the by-product coking industry to expand immensely. During the last year colliery owners of coking plant have listened to those who have sought to persuade them that steps should be taken to cultivate this market. The Authors of this Paper have consistently advocated this policy both in the Press and on the platform for some years, and it is a matter of gratification to us to find that positive action is being taken. The gas interests have for some years past had their organization in the London and Counties' Coke Association, and more recently a parallel organization has been formed in Birmingham for the Midland Section. It seems likely that the Leeds-Manchester area and the North-East Coast will follow, and indeed there is a somewhat similar organization already in existence on the North-East Coast. In the Yorkshire area more than 80% of the coke oven producers have formed themselves into a Coke Producers' Federation; Yorkshire and Durham established a Coke Co-ordination Committee; the Notts and Derby coke oven owners have also formed themselves into an Association, and on the North-East Coast the coke producers have associated into one body with the gas coke producers. The next step must undoubtedly be to extend the scope of these price-controlling organizations. The gas associations recognize that they must popularize coke for existing uses by giving technical assistance to architects, heating engineers, and others, and that in addition they must conduct research development work in order to find new uses for coke. It is evidently going to be necessary for the coke-oven interests to collaborate closely with the gas interests in all these activities as well as in price-control and output organization, and we look forward with some confidence to an extension in this direction. When this subject is handled in a properly comprehensive manner there will be no need for colliery-owned ovens to fear the disappearance of their blast-furnace coke trade. The interests of all concerns carbonizing coal have in fact become identical in so far as each one is forced by economic conditions to realize a fair value for every product obtained from coal. Any other policy but that of co-operation is, therefore, suicidal.

The economics of by-product coking have changed profoundly since the prosperous pre-war days of the industry, and to-day it is not advisable on economic grounds to build small plants carbonizing, say, 50,000 tons of coal per year. Some of those who are keenly interested in the domestic coke market have the impression that once there is relaxation of the pressure on the ovens to produce blast-furnace coke, the domestic market will be flooded with cheap oven coke. In our view this is unlikely, and we propose to give figures to support our opinion. It must be said at the outset that these figures do not refer to any particular plant, nor to any particular district. It will be easy and correct for any coke-oven owner to say that his own figures differ materially from those here given in detail, but in principle they indicate the correct order of magnitude, and we are disposed to think that they are reasonably typical. We have deliberately costed per unit of coal since this is the only way in which carbonizing costs in different districts can be accurately compared. Further, we wish to emphasize the importance of carbonizing as a means of realizing a fair return for coal.

TABLE 1.

| | Plant 1. | Plant 2. |
|---|---|---|
| Size of plant—tons of coal carbonized per day | 1,000 | 400 |
| Capital cost—ovens and by-product plant | £400,000 | £220,000 |
| Capital cost per ton of coal carbonized per year, assuming output at 90% | £1·22 | £1·68 |
| | s. d. | s. d. |
| Gross costs per ton of coal carbonized— | | |
| Coal | 15 0 | 15 0 |
| Labour, management, laboratory, &c. | 1 3 | 2 0 |
| Capital charges including depreciation (at 10%) | 2 5½ | 3 4½ |
| Repairs | 0 6 | 0 8 |
| Rates, taxes, and insurance | 0 8 | 0 10 |
| Steam, power, and materials | 0 10 | 1 0 |
| Profit (say 10% on capital cost) | 2 5½ | 3 4½ |
| Total gross cost per ton of coal | 23 2 | 26 3 |
| Return from by-products— | | |
| Tar—5% at £2 a ton | 2 0 | 2 0 |
| S/m—assumed to have little value | 0 3 | 0 3 |
| Crude benzole—4½ gallons at 9d. | 3 4½ | 3 4½ |
| | 5 7½ | 5 7½ |
| Net cost of coking 1 ton of coal, when the gas is not sold | 17 6½ | 20 7½ |
| Net cost of coking 1 ton of coal, when 6,000 cu.ft. of gas is sold at 6d. per 1,000 cu.ft. | 14 6½ | 17 7½ |
| If the yield of salable coke is 65%, the sale price of the coke at ovens must be | 22 4 | 27 1 |

In Table 1 will be found typical figures for two plants of widely different output.

It will be evident from these figures—

(1) That the larger plant is a good deal more economical than the smaller;
(2) That it is always essential in a new plant for a reasonably remunerative outlet to be found for the gas; and
(3) That there is no likelihood of cheap coke being produced in by-product coke ovens, especially since most older plants have been recently modernized at considerable capital cost.

It will be remarked that the price of coal has been taken as 15s. a ton It seems to us unlikely that there will be any considerable fall in the price of coking slack, because the tendency is for the prices of the various sizes of coal to become uniform. In proportion as the demand for large coal falls, so will this tendency become more marked, and the disposition will be for the price of small coal to increase rather than to decrease. It is evident, therefore, that the day is passing when coke can be bought cheaply, and it is necessary for the industry to pursue a long-term sales and publicity policy that will bring the public to appreciate the value of coke as a solid smokeless fuel. It is also obvious that this campaign will be materially assisted by, and indeed may be impossible without, the co-operation of the manufacturers and designers of coke-burning appliances.

In the past it has been regarded as inevitable that coke prices should slump to a far greater degree than coal, the view held being that coke ovens must be worked at any cost to clear the colliery output of slack. We hold that this view is no longer valid, and consider that in its own interests the coal industry should regard the maintenance of coke prices in relation to other fuels as an essential part of its policy. So far this commercial phase does not appear to have been taken into account in coal selling schemes, but it is of sufficient importance to merit attention. It must be obvious that low coke prices will react on coal prices—the converse being already accepted. There are doubtless many who would welcome a large fall in fuel prices, but even these will concede that the fuel-producing industries must be solvent.

## Future Developments.

Future development depends very largely on a correct analysis of the many principles involved together with a logical commercial attack.

The rise of carbonization in coke ovens was largely fortuitous. The value of coke was based to a great extent on the absence of market value of the raw material, slack. The iron industry built itself up on this value. The increasing demand for coke, and hence for the coal from which to make it, has increased in a complete change of market conditions. Other coal-using interests, too, have sought to take advantage of the low evaluation of slack and have incidentally learned how to use this product with at least as great an efficiency as the larger sizes of coal.

It has been established that small sizes of coal can be efficiently utilized and, further, that a carbonized fuel—solid or gaseous—is admirable in all respects for domestic use, so we feel that the way has been cleared for a change of outlook. We would place an equal value per ton upon the whole of any particular seam of coal regardless of size (but, of course, taking the content of incombustible matter into account) and postulate that slack is worth no more and no less than the rest. Without going any closer into detail, it being beyond the scope of this Paper, we feel that this equalization of values would not result either in greatly increased prices of coal for carbonizing or any decreased revenue from mining, rather the reverse. This point is mentioned, however, since demonstration of this fundamental issue would permit of tremendous expansion in the carbonization industry to provide for the 40,000,000 tons of household consumption previously mentioned.

Undoubtedly popular opinion will play a large part in bringing this development about. That movement in this direction is taking place is self-evident from the facts to which we have called attention. The fulfilment of such a gigantic carbonizing development has, of course, its major problems which might become inconveniently intense if progress is forced.

Certain important steps are needed before raw coal disappears from the domestic hearth. These are:

(1) The public must be educated to accustom it to the displacement of raw coal. This could not be complete until a generation of memory "of the good old days" has been gathered to its fathers.
(2) There must be complete alteration in the outlook of coal-mining interests.
(3) The price charged for fuel to the consumers must be readjusted on a rational basis.
(4) It must be realized that the carbonization industry has passed the Cinderella stage and must be developed for the future by its own specialized technical and commercial staffs.
(5) The fact that gas and coke are partners in the fuel market, each assisting the other, must be given practical expression by close collaboration between the Gas Industry and the coke ovens for gas and coke disposal.

The household fuel demand is naturally to a large extent seasonal. This is equally true in the case of coal, coke, and gas. It is rarely possible to stock coal for long periods so that so far as mining is concerned fall in demand at once affects output. The effect of this on the cost of mining is considerable, calling as it does for apparatus and personnel to deal with peak months. It would be interesting to have an accurate statement as to the saving which could accrue by mining a given annual output in equal weekly amounts as opposed to the present winter-summer ratio.

In a greatly increased carbonization programme we see the possibility of going a long way towards achieving this aim. Coke can be stocked successfully and a winter peak load of gas can be provided for by the modern combination type of oven.

To provide a carbonized fuel for the householder and metallurgical coke for the iron trade is thus relatively simple. The technical and commercial problems of gas, tar, and oil disposal are not quite so easy. So far as gas is concerned the farthest points of our country are not greater in distance from the coalfields than that which has already been traversed by gas mains in other countries, and there exist highly skilled organizations in the Gas Industry capable of taking care of this aspect. All depends on the quantity of gas transmitted per unit of capital outlay, and a considerable extension of gas in the industrial field will be decisive in this direction. The logical outcome would be a further displacement in this field also of raw coal by the products of carbonization. Tar and oils and synthetic spirit made from surplus gas constitute a further problem, but a glance at the colossal imports of oils from abroad—10,717,983 tons in 1936—leads us to believe that this is not an insurmountable difficulty. In the light of present knowledge it would be advantageous and probably necessary to reserve the whole seams of the best coking coals purely for the manufacture of metallurgical coke, which in turn could be mined cheaper on this account. We believe that the development of pithead carbonization on the lines suggested would make this possible while satisfying the nation's requirement for fuel in other respects. The present anomalous position of coal being a competitor of coke (possibly made from the same seam) would be removed.

By-product coking is undoubtedly a fundamentally important industry to the nation, but to realize its full value both by those who own it and those who use its products it requires to be developed by men who specialize therein both technically and commercially. Plants must be laid out in a style and on a scale which will permit of the application of new discoveries, and depart once and for all from the sporadic working which has too frequently characterized them in the past. No one would question the statement that coal is a most important national asset. Why then should the matter of working the asset to give the greatest national service be relegated to a secondary position?

In conclusion we would refer to the curious myopia on the part of the coal trade which results in a tooth-and-nail determination to retain the house coal market. Slowly but surely public opinion is coming to the conclusion that the domestic fire should be smokeless. Public opinion has already insisted that the smoke from the industrial chimney shall be drastically curtailed. It seems to us inevitable that public opinion ultimately backed by Parliamentary legislation will in years to come prohibit the use of raw coal in the domestic grate. It would seem to us to be a matter of elementary prudence that the coal trade should take up this matter of household coke firmly and actively in order that the undoubted loss of revenue which would to-day follow the

disappearance of the house coal market can be recouped by the additional value of the coal which is carbonized and converted into smokeless fuel. On many previous occasions the coal industry has been warned against its mistake of allowing the fuel industries based on coal as a raw material to pass into other hands. The production of solid smokeless fuel is very definitely a case in point, and it should be the business of every colliery owner generally to see that they have whatever profits there are in this business. We believe that the simple and elementary method of compensating for the loss of the house coal market by increasing the price of coal to those who make smokeless fuel—whether solid or gaseous—is too crude to provide a satisfactory solution of the problem under the scientific conditions of the twentieth century, and we believe that widespread collaboration between the coal interests, the gas interests, and the coke ovens should result in a very profitable business in gaseous and solid smokeless fuel which will obviate the undoubted difficulties which must follow the loss of the market for household coal.

We have thus attempted to indicate what we believe to be a rational development of the by-product coke oven, at the same time putting forward a plea for price stabilization on lines advantageous to both producer and user.

## Discussion.

The CHAIRMAN (Major Lamonby, Managing Director of the Grassmoor Company, Ltd.) said that the necessity for research work had been strongly stressed by the Authors and he was wholeheartedly in agreement with them. The cost of it should be borne by the Industry and a very small levy per ton of coke should raise a quite considerable and sufficient sum for that purpose. He urged also that all research work in connexion with coke should be properly co-ordinated. At present it was being done rather haphazardly by individual concerns in various parts of the country. One direction in which research work was very necessary was in finding new uses for coke. Undoubtedly there was a very large market in this country; he believed the consumption of coke in some other countries, apart from the coke used for central heating, was very largely in excess of the consumption here.

Mr. GEORGE HELPS (Nuneaton Gas Company) said that the Gas Industry in recent years expended far too much of its energy in producing coke and promoting its use for all kinds of purposes for which cheap gas would be better suited. In that way the Industry was playing into the hands of the coal-owner, who could produce coke for less money than the Gas Industry and, incidentally, produce gas at the same time. Unless that sort of thing was checked the Gas Industry would cease to manufacture gas and would become merely distributors; it was inclined deliberately to give the greater part of its potential trade to the coal people, or so it seemed to him. The Gas Industry's chief job was to supply gas (for which it held a Parliamentary monopoly) and not to supply coke if it could help it, because to a very great extent coke competed with gas and let in the coke-oven people. A general change-over from solid to gaseous fuel was just about due. Providence must have such a change in store for us, and the complete gasification of coal would come along. The people of this country had been so far done out of the advantages of cheap gas by the mistaken attitude adopted towards coke. Gas coke was produced to cheapen gas, but there were other and much sounder methods to that end. He submitted, especially to the great fuel technologists associated with the Institute, with the greatest possible respect—but at the same time with every conviction based on a fairly long practical experience—that it would be well worth while for a special Committee to be formed of two or three practical men to look into the different systems of gas production and application actually in operation to-day, with a view to becoming familiar with some of their outstanding characteristics—testing out the actual results, and then appraising the practical value of each system.

Mr. JOHN ROBERTS, with regard to the gas and coking industries being partners in the fuel market and the suggestion for closer co-operation between them, said the Authors were in effect proposing a two-power pact—not quite the two-power pact that Mr. E. V. Evans had recently proposed between the gas and electrical industries. But he personally would like to go further than a two-power pact between the gas and the coking industries, and to propose a four-power pact, which would include also the low-temperature carbonization industry and the natural smokeless fuel producers. They were all producing smokeless fuels and competing in the same market; if it were necessary for the first two to collaborate, the other two should be brought in as well.

Mr. G. M. GILL, as a matter of interest, said that a gas company with which he was concerned had quite recently commenced to take a supply of coke-oven gas from a distance of eleven miles to its gas-works, and had closed down the manufacturing plant used previously. As a stand-by, in case the coke-oven gas supplies should fail, a plant had been installed to make gas from fuel oil, on the lines on which gas had been made in California for many years past. That type of plant had not been installed anywhere else in this country for the purpose of standby, but it made gas which was in all respects precisely the same as the coke-oven gas; consumers could change from the use of one to the use of the other without altering bunsen burners or making any alteration of any kind. Mr. Leon B. Jones, who had spent his whole business life in making and operating oil gas plant in California, was present at the meeting.

Dr. G. W. ANDERSON said while the Authors considered co-operative work on the part of the coke producers—gas-works as well as coke-ovens—it seemed that they had not looked far enough ahead with regard to the disposal of the gas which must be produced at the colliery coke-ovens. He asked whether they considered that gas-works should shut down and become merely gas distributors, or whether they visualized some other co-operative basis on which the collieries and the Gas Industry could combine. It was all very well, he said, to talk of cheap gas. It had been stated, without challenge so far, that to all intents and purposes the Gas Industry could produce gas as cheaply as could the coke-oven plants. Moreover, it must not be forgotten that coal could be transported more cheaply than gas and coke to the point of consumption, and, therefore, one had a right to question the wisdom of concentrating production at a point at which the coal was mined. Another matter which must not be overlooked was the seasonal demand for gas. Wherever the demand for gas was uniform, it was produced at an extraordinary low figure, but when load factors came into play the cost of production increased by leaps and bounds. Unfortunately, the Gas Industry as a whole could not boast of a load factor much beyond 65-75%, whereas the load factor of coke-ovens, as shown by statistics, was about 80-85%—just below the figure given by the Authors. In those circumstances, one had to consider who was to take up the variations in the load factor in the future, who was to shut down plant in order to correlate the production of coke, gas, and so on.

Mr. E. W. L. NICOL said that, in spite of the coal shortage during the first coal strike, in 1912, the coke produced in London at that time was very largely unsalable, and he had heard that the dumping of coke at sea was really contemplated—though he had no direct knowledge as to whether that was so. At that time there was literally no remunerative market for coke. But in 1913, in order to cope with that situation, Sir David Milne-Watson had conceived and formed the London Coke Committee. Much of the work of the Committee was concerned with the development of coke-burning appliances. It was his privilege to design and introduce the first flat-top domestic coke boiler, the sales of which were estimated at 150,000 a year nowadays. Inasmuch as each one consumed, on the average, 3 tons of coke per annum, the development was equivalent to a potential annual increment of 450,000 tons a year in the demand for coke. Following the introduction of that boiler he was able to design and patent a system of burning coke on mechancal chain grate stokers for power stations. He had introduced breeze as fuel at the power stations in this country during the war, and that market had developed remarkably. According to the annual returns of the Electricity Commissioners, the consumption for that purpose had been as high as 250,000 tons a year, and he calculated that more than 3,000,000 tons of coke altogether had been sold in that market. A subsequent development was that of the open coke fire, the first of which he had patented in 1921. It was estimated that present-day sales of those fires had reached 100,000 per annum. In London alone, 70,000 had been installed, the Gas Light and Coke Company having installed 40,000. They were being installed at the rate of 500 per week during the winter. The consumption of each fire was about 2 tons per season, and they represented another potential annual increment of 200,000 tons.

Mr. W. L. BOON said that the coke-oven coke producer was not familiar with the inland trade, whereas the Gas Industry was familiar with it, and that was one feature which called for co-operation and co-ordination, because without it future conditions would not be good for the trade—for the individual producer, for the Gas Industry, or for the coke-oven industry. That slump condition was evidenced by the quantity of coke which would be available at the end of this year over the requirements of the market. The demands of the market for coke to be used for steel, for armaments, and for export were not stable; already there was a weakening, and, although he did not wish to be regarded as an alarmist, everything pointed to slump conditions a year or two hence. But he submitted that the whole of the coke manufactured in the country to-day could be absorbed readily if there were co-ordinated market development. There had not been such co-ordinated development between the two industries. There had been co-ordination in the Gas Industry and one had seen the position arise in which it was able to sell more coke than it could make. But we could not absorb the large quantities which were looming in the future without co-ordination between industries. In one sense it was true that the producers asked only

for an economic price. But they should ask for an economic price, not merely this year or next year, but continuously with stability in trading. We could not expect the fuel market to develop sanely by following the system we had followed in the past —*i.e.*, of taking advantage and exploiting situations, so that the prices of commodities had soared far above the economic level. When the slump loomed in the future the producers could secure economic prices if there were the co-ordinated development which engineers normally could bring to bear upon such problems.

Mr. A. K. STEEL, supporting the remarks of Mr. Boon, said that with the coming of the new high silica oven (which was expensive to install and could only justify itself if worked to fairly full capacity), and bearing in mind that modern steel plants had generally very good selling organizations for their by-products, the coking plants would not be shut down, as had been the case in the old days, when the output of the blast furnaces was reduced. The owners of the coking plant would endeavour to keep the plant going. Therefore, although the Authors had quite logically segregated the coking plants at the collieries and at the blast furnaces, he suggested there was a danger in making too hard and fast a line between them, in view of the possibilities of a slump. There would have to be a scheme for marketing in the domestic market the coke made at the collieries and the iron and steel works. He did not think that the iron and steel industry would operate a modern high price battery of coke ovens at half output. Any plan of co-ordinated selling must take into account the large quantity of coke which would be thrown from the metallurgical processes on to the domestic market—and present conditions could not be regarded as being entirely normal. The Authors had postulated that an equal value per ton should be placed upon the whole of any particular seam of coal, regardless of size, taking only the content of incombustible matter into account. That, as was implied, affected one of the fundamentals of present day selling policy, and although one must admire the courage of the Authors in suggesting it, he asked them to expand that point. It would seem that they were far from the time when very small coal of the duff variety could be valued as highly as the larger and more defined material.

## Oil Gas Standby Plant.

Mr. LEON B. JONES said his purpose in England was to install the oil gas plant mentioned by Mr. Gill as a standby for a gas undertaking which was taking a supply of coke-oven gas. It was a plant which could be started very quickly and which would supply gas which was an exact duplicate of the coke-oven gas. The fact that such plants reduced very materially the capital investment necessary for standby equipment aided the possible co-operation between the two industries.

Mr. P. C. POPE (Secretary of the Institute), discussing sulphur in gas, referred to the recent development in France of a new process for eliminating it at considerably reduced cost. He happened to know something of that process and had every reason to believe that plant for the elimination of sulphur was to be built and installed in this country. Probably a period of about twelve months would elapse before the plant was completed and had overcome its teething troubles and had settled down, but it was to deal with 1½ million cu.ft. of gas per hour, and as soon as it was in operation and had given actual results, he hoped to arrange for a Paper to be presented to the Institute with regard to it. In that plant there was first a treatment for the separation of tar fog and benzole and then the gas was passed on through absorbers, using a certain catalyst, the sulphur being produced actually in salable form. In that particular plant the sulphur elimination was guaranteed to be 93%, starting with a sulphur content in the gas of 2·8 grammes per $m^3$.

Mr. A. F. WEBBER remarked that the adoption of the suggestion that all coal should be completely gasified at the pits, and that both coal and coke should be entirely replaced by gaseous fuel for all domestic and for a very large range of industrial uses, would mean the utter and irretrievable collapse of the whole railway system of the country; whether or not that total gasification of coal at the pits was worth such a price he would not care to say. The Authors envisaged a levelling of coal prices, so that slack would become dearer and house coal cheaper. That rendered more difficult the use of coke to replace house coal; increasingly expensive coke would be competing with domestic coal which was becoming cheaper, and that competition would be difficult—unless the use of raw coal was to be prohibited by Parliament.

Mr. G. P. DAVIES suggested that with modern developments of automatic appliances for burning cheap coal the Gas Industry should not raise the price of coke to too high a level; if it did so, he was afraid it would lose the coke market and would find it very difficult to retrieve if and when a slump occurred.

## Mr. Bradley Replies.

Mr. BRADLEY, replying to the discussion, said that Mr. Helps had taken a jump of many years. He was not prepared to argue whether or not Mr. Helps' vision was right or wrong, but one could at least use his theme and point out that one development preceded another and that the present might be a passing phase, but the facts of the moment were the facts with which we had to deal.

Most of the other speakers had dealt with the problem largely from the wrong point of view—from the point of view of either gas, or coke, or coal. The point emphasized in the Paper was that the fuel industry must realize the utmost value from the various materials it produced. It should not regard gas as the main product and get what it could for the rest, and it should not regard coke as the main product and get what it could for the rest, as had been done in the past. It was that policy which was responsible for the infernal mix-up they had to straighten out to-day. If they tackled the matter on a scientific basis, on the bases of equivalents and the laws of Nature, they would get somewhere. Co-operation between the various parties should be relatively easy on those bases. It was wrong to put £ s. d. figures forward without knowledge of what was meant. The low-temperature carbonization industry insisted upon a very high price for one part of its output; but a time would come when that would no longer be possible.

As to the supply of gas to gas undertakings, he pointed out that the modern combination coke oven had a load factor, when working under full coke output conditions, of from 50 to 100%. That in itself would take care of any demand by gas undertakings.

As to the policy to be adopted by the steelworks when steel output was reduced, he said he believed the steel makers would find that, on economic grounds, they would have to devise some method of keeping the ovens warm at considerably reduced output or would even have to shut them down, because they would not be able to keep them going as independent units or absorb the whole of their product. In steelworks the ovens could never be justified as separate entities; there were several reasons for that, which he would deal with in a written contribution.

Dealing with Mr. Steel's criticism of the suggestion concerning an equal value being given to every ton of coal from a particular seam, he said that certain reservations with regard to purity were made in the Paper. Perhaps they should have made another reservation with regard to the cost of raising its purity to a given standard; that was a relatively small proportion of the total price of the coal.

Commenting on Mr. Webber's remarks concerning the levelling up of the prices of slack and of coke and the levelling down of the price of house coal, he said that that levelling process was almost complete to-day, and the Authors had used a figure beyond which they did not think the price of slack was likely to rise. But it was also a figure to which the prices of other coals might come down. In view of the fact that so much slack was available and was likely to be available in the future, some rational means of carbonizing and working up that slack was indicated; by such means the slack was likely to command a good price.

## Dr. Foxwell's Reply.

Dr. FOXWELL, who also replied briefly, and reserved his reply mainly for a written communication, said his own view of the future was that the all-gas industry would come, though not in their day. Therefore, it was necessary to deal with the Industry as it existed at present, and to appreciate that coke was a means of helping the sale of gas.

The remarks of Mr. Webber, concerning the levelling up of the prices of slack and of coke, and the reduction of the price of coal for domestic use, emphasized the importance of Mr. Boon's contribution. It seemed that the power of scientific marketing had not been fully realized. People had been made to eat mustard and fruit, and even to take up physical culture, as the result of scientific marketing. The campaign with regard to physical culture had all the weight of the Government behind it; it had the backing of the highest persons in the land, and that was an example of scientific marketing. He urged that, with scientific marketing and co-ordination, the public could be made to realize that coke was worth more than house coal, and to pay for it accordingly.

With regard to the point that the coke-oven product was furnace coke and, therefore, was not suitable for use except in furnaces, he said that was merely because the coke-oven operators had been asked to turn out furnace coke. There were many ways in which coke-ovens could modify their methods of carbonization—by lowering the temperature, by blending suitable materials with their coals, by using different coals or by modifying their coals—and could produce in the coke-ovens a material which was practically the same, very little less combustible, than low-temperature coke. A coke-oven plant was being built in Durham —he believed it would be in operation in April next—which would produce about 100,000 tons per annum of low-temperature coke.

# Southern Association of Gas Engineers and Managers

# Presidential Address

OF

**D. C. CROSS**

(Engineer and General Manager, Lea Bridge District Gas Company).

THE PRESIDENT.

Mr. D. C. Cross joined the Lea Bridge District Gas Company in 1903 as an articled pupil under his father, Mr. F. W. Cross, M.Inst.C.E. He was in due course promoted to Chief Works Assistant and afterwards Works Manager. In 1925, on the partial retirement of his father, he was appointed Chief Engineer of the Company, and on the election of Mr. F. W. Cross to the Board in 1929, Mr. D. C. Cross became Engineer and Manager, while he now holds the position of Engineer and General Manager. Mr. Cross is a member of the Institution of Civil Engineers, and was President of the London and Southern District Junior Gas Association in 1922.

Delivered at the Annual General Meeting of the Association held at the Hotel Victoria, Northumberland Avenue, W.C. 2, on Friday, March 25.

Allow me to express my sincere appreciation of the honour you have conferred upon me in electing me your President for this year—an office held in the past by many worthy men and leaders of our profession. They have established a standard which I shall seek to emulate. Having been fortunate enough to follow in my father's footsteps in many of his activities, you will, I know, appreciate how I am especially proud and grateful to be elected to the same high office in this Association held by him some 32 years ago.

When I read recently the Presidential Address he gave so many years ago I was very impressed by the foresight and vision of his remarks, in view of what has taken place in recent years towards the closer co-operation of gas undertakings for the trading of residuals, and for the selling of gas apparatus.

Before referring to the main theme of his Address, there is one paragraph which I would like to repeat, as it is especially applicable to my feelings to-day. He pointed out that at our General Meetings we see around us many sons of worthy fathers carrying on the same work of gas engineering and management, and then went on to say: "I venture to think those sons who have already arrived at mature age, and have assumed similar responsibilities, would support me in the assertion that most of the knowledge they possess they owe directly or indirectly to the foresight of their fathers in their profession, and to the examples of perseverance set them, which have advanced them in the profession even beyond the knowledge of those fathers." I would here like to acknowledge my everlasting indebtedness to my own father to whom I owe so much.

Now at the time when he wrote his Presidential Address, gas undertakings were just beginning to feel the effects of electrical competition, and were somewhat apprehensive of the future. Apparently each engineer was working on his own without the slightest co-operation or exchange of experience with his neighbours. My father suggested that, in order to combat this growing electrical competition, it was vitally necessary for gas engineers to have a scheme of co-operative intercommunication, so that those joining would ultimately become more or less intimate with the methods adopted by others, and, in course of time, such co-operation would doubtless lead to the unification of their methods of commercial management. He suggested the formation of a London Commercial Section of this Association, and to quote his reason—"in order to endeavour, by a system of intercommunication and co-operation, to arrive at a unification of the commercial methods adopted by the various companies." An outcome of his suggestion was the formation of the Eastern Commercial Section of this Association, which has been of immense value to many engineers—especially the exchange of information on markets, which has greatly helped engineers until the recent formation of co-operative groups.

## Co-operation.

He endeavoured to go a step further, and outlined how he had invited the secretaries and engineers of companies in and around London to a meeting, in the hope of forming a co-operative group very much on the lines of the present London Group. He stated that a perfectly unanimous opinion was expressed as to the desirability of intercommunication and co-operation in regard to methods of management and distribution, but difficulties arose as to its inauguration. It was stated that he was aiming at an ideal which would be very difficult to achieve, and if his desire was for absolute uniformity in methods it would be doomed to failure from its inception. He finished his Address with the following significant sentence: "I would therefore again urge the necessity for union and unity not only in our Associations, both parent and affiliated, but also among ourselves—mutual unselfishness, mutual counsels, mutual assistance, with but one end in view—viz., the successful maintenance of our profession in spite of all opposition and competition." These are words of advice which could well be repeated to-day.

I trust you will forgive my referring at such length to my father's Address, but after more than 30 years the Gas Industry has at last realized and appreciated that our real strength in meeting increasing competition lies in complete co-operation and unification of methods for the selling of residuals and gas apparatus, as shown in the formation of the London and Counties Coke Association, the various Co-operative Tar Groups, the Benzole and Sulphate of Ammonia Associations, and now the formation of what is known as the London Group for selling campaigns, all of which have been, to a degree, successful.

A development which has come about in the last 30 years, and one which has perhaps helped the Industry more than anything else, is the willingness of the larger gas companies to give the results of their research work and experience for the general benefit of the Industry, and the formation of the present Industrial and Domestic Centres, which have been of great value to the sales staff of affiliated companies. This has allowed smaller undertakings with limited staff to take full advantage of the information obtained from intensive research work, so that they can be run almost as efficiently as the larger undertakings.

We all appreciate that the stronger and more efficient we

can make the smaller cogs of the machine of our Gas Industry, the stronger the whole machine will be to meet the acute competition of the present day.

## Need for Uniform Selling Policies.

This brings me to our present need for even further co-operation in an endeavour to obtain more uniform selling policies between neighbouring undertakings, and even a wider exchange of experience of the performance of new apparatus for the utilization of gas, and also of any improvement in plant or methods of manufacture of gas. An experiment has been tried in the last two years over a wide area in and around London, to arrive at a uniform advertising and selling campaign for specific pieces of apparatus—as gas refrigerators, sink water heaters, and gas fires. While the methods of organization have been criticized, the experiment has proved beyond doubt the value of co-operative and uniform selling policies, and it is now suggested to organize this co-operation on sounder and more democratic lines. I firmly believe it will be of great value to all those undertakings working together, and I look for an even wider extension of uniformity in selling policies, and also in an unselfish exchange of information or experience gained and tests carried out on new and old apparatus. As an example of the need for fuller exchange of information, I give the case of a certain gas apparatus which was fairly popular among gas undertakings a year or two ago. Several of the larger undertakings have carried out exhaustive tests with this apparatus and have proved its unreliability, and its inferiority as compared with other similar apparatus on the market. The result is that they are no longer advertising or pressing the sale of this particular apparatus, whereas some smaller undertakings without the facilities for research work are, perhaps in ignorance, continuing to advocate its sale. In consequence any dissatisfaction caused in the future by possible failures will react detrimentally over a much wider area than that supplied by the smaller undertakings. Therefore, I cannot over-stress the necessity for the fullest interchange of experience between gas undertakings to strengthen our fight against a common competitor.

There has been a remarkable change in the last 30 years in other respects than those mentioned above in the outlook of those associated with gas undertakings. Recently I came across a letter written by one of the shareholders of my Company in 1912, from which I will quote an extract. This shareholder wrote: "As regards paying more money to employees, I strongly object. We shareholders ought first and only to be considered. If the Company fail, what Act of Parliament will help us? Every month brings some new tax or threat, and as a poor man struggling to keep a wife and family and not asking for charity from your employees, I object to their asking it from me. If you can't get cheap servants, why not advertise for German ones? I not only protest, but ask you to bring forward such protest in any proper way it may be your duty to do so. I also think the expenses of this circular are not justified by the terms of your incorporation or license, as apparently your Company is becoming Socialistic and Lloyd Georgian in finance. I shall take the first opportunity of selling out and investing abroad."

I am thankful to say the attitude towards the employees in the Gas Industry to-day is quite the reverse. In the case of the Company I have the honour to serve, we have a Co-partnership Scheme whereby to all employees collectively is allotted a sum equal to a tenth of the dividend and interest paid to shareholders. We also have a liberal Contributory Pension Scheme, a Welfare and Benevolent Scheme to help in sickness and distress, as well as sports and other activities, all fostered and helped by the Company. I firmly believe, in consequence of this change of attitude, that we are attracting a better class of employee, and—what is of greater assistance than we perhaps appreciate—a more contented employee.

## Obsolete Apparatus on the District.

Another vitally important necessity of the present day arises from the growing habit of travelling and visiting among friends. In the last ten years many companies have experienced extensive building developments in their areas of supply, and have been hard pressed to cope with the orders coming from new building estates, as well as business accruing from national and local campaigns for selling new apparatus. The result has been that their efforts have been almost confined to selling and fixing new apparatus, and I am afraid that the old apparatus on the district has in many cases had to look after itself. I think many of us would be disagreeably surprised if we were to know the condition of some of the gas apparatus and gas lighting burners on our districts. Much of the value of our expensively-equipped showrooms, elaborate selling schemes, and advertisements is nullified by the effect of the adverse publicity that gas is getting from the large number of obsolete, inefficient, badly regulated, and damaged gas apparatus in use in consumers' houses, and noticed when friends visit each other. How often it is our experience to enter a room frequently used by the public, such as waiting rooms of public or charitable institutions, or a doctor's, dentist's, or solicitor's room, and find an old-fashioned, inefficient gas fire with broken radiants, and perhaps causing fumes to enter the room. An appliance of this nature creates a very harmful impression against gas in the minds of many visitors. Also, I suggest there are many old gas lighting burners in use, badly regulated and with broken mantles, which are driving consumers to thoughts of electricity.

I recollect three instances last year which brought this point very forcibly to my mind. Two hotels I visited in the summer, one while on holiday, had gas fires in the bedrooms just stuck in front of the iron grates in the hearths, badly fitted, with no surrounds, and looking dreadfully unsightly; and, in addition, the radiants were broken. In one case every radiant was broken. The impression upon everyone seeing these fires must have been very adverse to gas.

The other instance was a visit to a fairly large boys' school in our district which is still lit by gas. Some of the burners and fittings were bad, completely obsolete and inadequate, and I remember thinking what an excellent advertisement this was for electric light to the rising generation. I may add that this condition has been corrected.

I therefore suggest that it is just as important to maintain existing apparatus in good, efficient order as it is to push for new business. Every endeavour should be made to replace old inefficient appliances, and therefore I feel that I cannot over-emphasize the importance of a system of maintenance whereby every piece of apparatus is overhauled and examined at least once a year. All public waiting rooms and surgeries should have special attention and every care that only the most up-to-date apparatus is in use, if only for its advertising value. I have been struck with the advertising value of a satisfied consumer. Our Company has done little to push coke fires, yet the number of orders for new coke fires we received last year was most satisfactory. We traced a large percentage of the orders to recommendations from satisfied coke consumers, who had pointed out the advantages of the coke fire to their friends. Let us try to spread the same spirit of recommendation to all our gas consumers.

I strongly commend the practice instituted by several companies two years ago of guaranteeing maintenance when selling new appliances, and asking the customer to make a contribution towards the maintenance costs when purchasing gas apparatus.

Before I leave the question of gas apparatus I would like to make a strong appeal against the old practice of fixing a gas fire in the hearth in front of an old iron grate and with no finished surround. It spoils the whole look of the fire, and I consider it an incomplete job and quite a blot on the appearance of the room. It is quite a simple matter to fit an inexpensive surround, pleasing to look at, giving a finish to the fire.

Householders are taking an added pride in their homes and we should endeavour, where possible, to ensure that a reasonable finish is given to the fixing of every gas fire.

Several listening to me to-day may think that I have unduly emphasized the imperative importance of maintenance, and the periodical overhaul. But during my experience at Lea Bridge we have passed through a long period of intensive building development in our area, when we were hard pressed to meet the new installation orders. Now that our district is almost saturated, and there is little or no new building development, I have seen the great value and the necessity of being able to consolidate our position with existing consumers, adopting the slogan "What we have we will keep."

## Continuous Verticals at Lea Bridge.

Now as a Gas Engineer identified with a progressive Company all my professional life, you would expect me to say something of my experience at Lea Bridge. When I entered the services of the Lea Bridge District Gas Company over 34 years ago we had 4,557 consumers and an annual make of gas of 216 million cu.ft. To-day our consumers number 44,625 and our make of gas has risen to 1,168 million cu.ft. At times our progress has been quite rapid, and in the five years from 1915 our output increased by 54%.

In 1913-14 we erected one of the first continuous vertical retort installations in the South, and the pioneer troubles experienced with the retorts will never be forgotten, more especially with "hang-ups" caused by the irregular surface of the retorts in the zone of the lower combustion chambers. This was accentuated by difficulties incidental to the War Period.

However, we learnt one outstanding lesson—that where gas making is subject to constant interruption as from daily air-raids, continuous vertical retorts show to very great advantage in maintaining supplies. There is no flame or light from the retorts when they are charged or discharged, and we were able to keep them fully at work during the raids, while the rest of the works, including the water gas plant, was in darkness. Also we had the added advantage of a constant calorific value of the manufactured gas.

We have maintained our faith in continuous vertical retorts, for when we had to consider further extensions in 1929 we built a new retort house and installed a further 5 settings —*i.e.*, 40 retorts—of the same system. I firmly believe that where a small or medium sized works has adopted a certain system of carbonization, whether it be horizontals, verticals, or chamber ovens, it is more economical, should it be practicable, to stick to the same system when considering extensions. The staff can control the one system more efficiently, stokers are more easily interchangeable, and only one set of spare parts has to be kept.

The greatest advantage of a uniform carbonizing system for a works is the ability to supply one type of coke. The sale of this residual is becoming more and more important in helping to keep down the price of gas, and a great deal of attention has been given in the last few years to the improvement of the quality of coke sold, and the public have become correspondingly more critical of the quality of the coke received. Therefore on a medium sized works with two different carbonizing systems it will be almost impossible to guarantee the same type of coke to individual consumers, and it is almost certain that complaints will be received if there are indiscriminate deliveries of coke manufactured in two totally different systems of carbonization.

At a meeting convened by the National Smoke Abatement Society on Feb. 25, of delegates from all the Greater London Local Authorities, to promote the formation of an Advisory Regional Smoke Abatement Committee for London and Greater London, the only criticism made of the use of smokeless fuel was the complaint of a delegate that after she had obtained satisfactory results from a certain type of coke, a consignment of a different coke was delivered which was totally unsatisfactory and almost unusable. On complaining to the suppliers, the next consignment was similar to the first, and was satisfactory.

This delegate asked for some assurance that if the Regional Committee proposed to advocate the use of smokeless fuel in place of coal in domestic grates, consumers would be able to procure a uniform coke of suitable type which would burn satisfactorily.

When we built our second retort house we introduced waste heat boilers. I will confess that, without waste heat boilers, it is difficult to justify the economic advantage of vertical settings over horizontal settings, but, with the recovery of a considerable proportion of waste heat, I definitely favour the vertical system.

There are two unique features of our newer installation which may perhaps be of interest to members. To economize in the number of waste heat boilers we have installed two in the new No. 2 retort house, and have carried the flues from the six settings in the old No. 1 house to the boilers on an overhead gantry 36 ft. above ground between the two houses, so that we are utilizing the heat from the settings in No. 1 house in the boilers in No. 2 house.

In the same way the coal wagon tippler for the new installation also coals No. 1 house by the extension of a belt conveyor.

### Coal Handling.

All our coal is received by rail, and with the aid of capstans and an efficient coal wagon tippler one man is able to deal with the unloading of all coal up to 200 tons per day, when the coal is received regularly as required. In the last 15 months companies like ourselves have been faced with a new problem which is going to increase the cost of coal handling in future, and we shall have to consider what steps can be taken to minimize these costs. Although the normal quantity of coal carbonized on our works is at least 30% greater in the winter than in the summer (on many gas-works it is a much higher percentage), the collieries are insisting on equal monthly deliveries throughout the year. In consequence gas undertakings will have the added expense of drawing heavily from stock during the winter, and replacing in the summer months, besides being left in a dangerous position at the end of the winter months should there be a national emergency. We started this winter with more than 6 weeks' stock of coal, and at the end of February we had less than 3 weeks' stock.

We have found the mechanical shovel an ideal machine for picking up coal from stores, and loading either rail wagons or direct to the elevator hopper.

### Coke Handling.

Coke manufactured in continuous vertical retorts from South Yorkshire coals has a tendency to be friable, needing careful handling, and must not be dropped through any height.

With the installation of our new coke screening and grading plant in 1932, we endeavoured to save labour costs as far as possible. All coke brought from the retort houses in telpher skips is tipped into a large concrete collecting hopper having a capacity of nearly 24 hours' maximum make. Therefore the coke screening plant is never worked at night. Coke is elevated from the collecting hopper by a long inclined belt to the screening and grading plant over the storage hoppers. It may be of interest to note that, when we were designing the plant, we wished to install the inclined belt at the steepest angle possible. We adopted an angle of 18° which we have found is about the limit with light vertical coke. We use spiral chutes in all our large coke storage hoppers to allow the coke to slide from the screens to the bottom of the hopper; this has been a great advantage in saving breakages. All coke before being loaded into sacks is debreezed by means of vibrating screens.

A small feature worth mentioning in connexion with coke handling is that every coke chute on any plant on the works is lined both bottom and sides with 6 in. × 6 in. × 1 in. blue quarry tiles; even the tops of the spiral chutes are lined with tiles to save excessive wear. The maintenance cost of these tiles is extremely small.

A problem which is increasing every year is the storage of sufficient coke for the heavy winter demand. The more we popularize the domestic coke fire and coke for central heating in winter the larger reserve we must hold. We find that storing a large quantity of coke manufactured in continuous vertical retorts, and from Yorkshire coal, is not so advantageous as it may seem, for after storing for several months there is a large percentage of small coke and breeze in the heap, lowering the value of the coke considerably when it is reclaimed. In consequence, it is absolutely necessary to put through the screens all coke that has been stored. Even nut or broken coke that has been stored is always re-screened before loading into sacks.

We have also found the mechanical shovel an excellent and invaluable machine for reclaiming coke from storage heaps.

### Gasholders.

Gasholders have hitherto been the concern of their users only, but under the provision of the new Factories Act, periodical inspections become a statutory obligation, and all gasholders of over 5,000 cu.ft. capacity have to be of sound construction and properly maintained.

My Company, in the past, have carried out periodical routine inspections, but in November, 1936, we decided to

investigate thoroughly the condition of our oldest gasholder erected 56 years ago. This was undertaken by an experienced gasholder construction firm. A brief description of the condition of the iron, and the necessary repairs carried out, may be of interest and helpful to those who have holders of approximately this age.

The holder, built in 1882, originally comprised two lifts 90 ft. and 88 ft. diameter respectively by 20 ft. deep, contained in an annular cast-iron tank and guided by 12 heavy cast-iron columns with tee section guide rails. About 30 years ago a third lift was added, the original outer lift being retained, the original inner lift was converted into a middle lift, and the crown cut back, and re-used in conjunction with new sides for the inner lift. The guide frame was not increased in height and the addition became a "flying lift." The three lifts filled the annular space of the tank almost completely and left little room for inspection or repairs when the lifts were grounded.

Our periodical inspections had disclosed that this holder was gradually getting out of level, and considerable deterioration of parts of the cups and grips was very apparent at wind and water level. A series of discs 2 in. in diameter was cut from the sheeting of the crown and the sides of each lift, and subjected to metallurgical examination. The visual inspection of the discs showed the metal almost its original thickness. The condition on the inside of the metal was in most cases good, one or two samples being slightly pitted, while the outside was good with no sign of corrosion, and one would judge the sheets to be in excellent condition. The whole of the original gasholder was wrought iron, and the tests of the samples cut from the sheeting and subsequently from some of the sectional material showed but little deterioration in substance or tensile properties, but the iron appeared to have lost its elasticity, indicating that the metal was becoming fatigued and somewhat brittle.

An average tensile value of 18 tons per sq.in. was obtained for the 56-year old sheets, whereas the 30-year old sheets had a tensile value of 24·8 tons per sq.in. The elasticity of the older material was practically *nil,* while the newer metal had an elongation of 3%.

The importance of these tests was subsequently shown during the repairs to the holder. Several of the iron sections, especially the outer lift grip channel, had become so brittle that as soon as any attempt was made to cut out the rivets holding the side sheets, the iron cracked very extensively and several sections of channels had to be renewed, including the whole of the outer lift grip. A sample was prepared from the cracked grip channel and tested, when the metal was found to be crystalline at the fracture. It is interesting to note that the cup channel of similar age appeared to be sound. A test piece was cut out for examination and was found to be in sufficiently good condition for further service.

It is the present-day practice to roll channels with flanges thicker than the web because they are frequently used for beam loads, but the old wrought iron channels of this holder were of practically uniform thickness throughout, and the substantial thickness of the web influenced us somewhat in retaining the cup channels for further service.

The expense of opening up and examining this holder internally was more than justified by what we found subsequently. One bay of the crown frame was in a very unsafe condition, the main rafter being cracked, the tension rod broken, and the purlins distorted, also the cup rollers and some of their guides were in a very worn condition.

## Advisability of Holder Inspection.

I would like here to stress strongly the lesson gained by our experience. From outside visual inspection the holder appeared to be in fairly good order and safe condition, with the exception of the sheets at wind and water level of the cups and grips, and sample discs cut out of the side and crown sheets showed little deterioration, the metal being of almost original thickness.

There is a general impression that the wrought iron of 50 or 60 years ago has an almost everlasting life if protected from the corrosive effects of the weather, and yet when this holder was opened and very closely examined, the crown frame was found to be unsafe, the nature of the iron so altered as to indicate that it was becoming fatigued and brittle, so that it was found advisable to renew certain sections.

This experience clearly shows the advisability of an examination even beyond that called for by the Factories Act of 1937.

The holder closely adjoins workshops and the general office, and when it was decided to put it out of commission for repairs the question arose as to the best method of purging the crown. A 2 in. pipe was inserted into the centre of the crown and taken to a height of 20 ft. above ground level. We had no available supply of flue gas or inert gas anywhere near, so we used a number of cylinders of compressed carbon dioxide, the gas being passed into the inlet main of the holder. In order to admit the $CO_2$ as quickly as possible, we fitted up a battery of cylinders discharging into a common pipe, and to facilitate a rapid discharge we had to play a small jet of steam on the valves and connexions from the cylinders, otherwise the connexions tended to become blocked by "snowing up."

This method proved fairly satisfactory as we were using an inert gas heavier than coal gas, which theoretically should drive the lighter gas out of the top of the crown, although according to tests taken during the operation, I am afraid the $CO_2$ was mixing fairly evenly with the coal gas.

We added sufficient $CO_2$ to give a high percentage of inert gas in the crown, and then we proceeded to purge completely with air from a small neighbouring air compressor. A test of the gas inside the crown of the holder just prior to opening up showed approximately 93% of air, and 2·2% of $CO_2$. This method of purging cannot, of course, be compared in cost with that using the plant described by Mr. Birks at the Institution Research Meeting last November, but it is effective for a small holder.

After the crown was purged, the tank was emptied of water, and the two outer lifts were raised by screw tackle to the extent necessary for repairing the cups and grips. The arrangement of the screw tackle and timber supports is interesting and is shown in the sketch (fig. 1).

The following repairs were carried out:

*Outer Lift.*—Grip channel and dip plate renewed. Vertical stays renewed.

*Middle Lift.*—Cup channel and skirting plates repaired. Bottom row of side plates renewed. Grip dip plates renewed. Cup rollers rebored and fitted with new axles.

*Inner Lift.*—Bottom row of side plates renewed. Cup rollers rebored and fitted with new axles. One bay of crown frame repaired.

*Guide Frame and Carriages.*—Reconditioned and adjusted throughout.

The cups and grips were painted with Humidine after repair, and the whole of the interior surface of the holder coated with hot boiled linseed oil.

We have also ascertained, by disc-cutting, the condition of the sheeting of our next oldest holder erected in 1899 (38 years old). Discs were cut from the sides of each lift and from the crown, and on testing proved to be in a very satisfactory condition. The sample discs showed the metal to be almost the original thickness, the condition of the metal being good on the outside and very slightly pitted on the inside. The average tensile value of the metal was 20·2 tons per sq.in., while the elasticity was fairly satisfactory.

Before leaving the question of gasholders I would like to offer a word of advice to any engineers contemplating the erection of a spirally guided holder. We erected a 2½ million cu.ft. 4-lift holder in 1922 in a steel tank above ground.

The diameter of the tank is 173 ft. and the diameter of the outer lift is 170 ft.

The numbers of spiral guide rails of the four lifts are 28, 21, 18, and 15 respectively. It is our experience that the number of guide rails is insufficient and that there is too great a strain on the joints of the intermediate side plates, with the result we often have to caulk leaky joints and rivets on the outer lift.

I strongly recommend the fitting of a liberal number of guide rails, and would suggest at least 38 and 30 on the two outer lifts respectively of a holder of the above size. Not only are the side plates relieved of a certain amount of strain, but also there will be less wear and strain on the guide rollers and rails.

## Gas Drying.

In 1932 we installed a calcium chloride dehydration plant and naphthalene washer to deal with the mixed gases on the inlet of gasholders. I am aware that there is still a difference of opinion in the Industry as to the true value of dehydration. I can only give our experience after six years, and without hesitation I say that the partial dehydration of the gas has been a complete success.

We are proud to use the slogan "Gas never fails." Whereas before the introduction of the dehydration plant quite a number of complaints had to be dealt with every day, due to failure of supply in consumers' services owing to water, rust, or naphthalene, now, after partial dehydration, service complaints are almost *nil*, and we can truly say "Gas never fails."

For the first two years after starting the plant we experienced a certain amount of trouble from rust, but this has now disappeared. When we first dehydrated our gas we

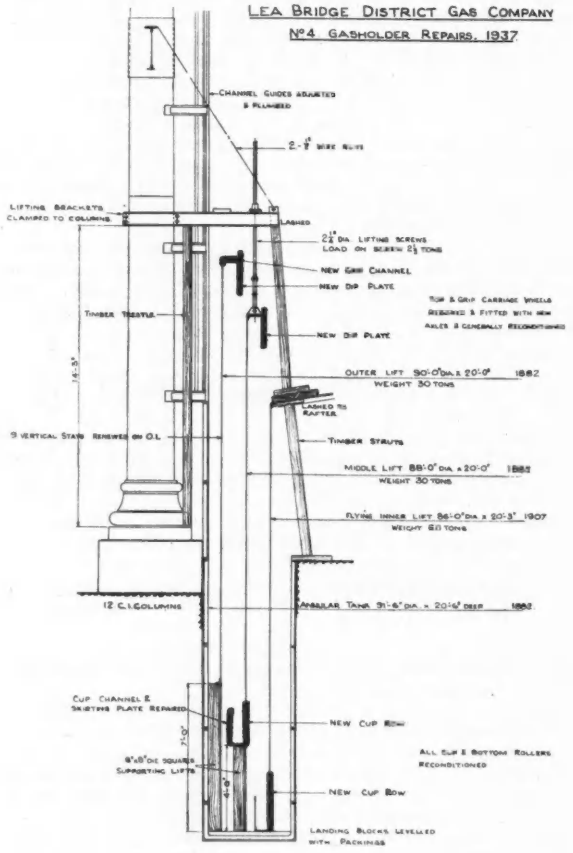

LEA BRIDGE DISTRICT GAS COMPANY
No 4 GASHOLDER REPAIRS. 1937
CHANNEL GUIDES ADJUSTED & PLUMBED
2-1" WIRE RUYS
LIFTING BRACKETS CLAMPED TO COLUMNS
LASHED
2½" DIA LIFTING SCREWS LOAD ON SCREW 6½ TONS
NEW GRIP CHANNEL
NEW DIP PLATE
TOP & GRIP CARRIAGE WHEELS RESERVED & FITTED WITH NEW AXLES & GENERALLY RECONDITIONED
TIMBER TRESTLE
NEW DIP PLATE
OUTER LIFT 90'-0" DIA x 20'-0" 1882
WEIGHT 30 TONS
LASHED TO RAFTER
9 VERTICAL STAYS RENEWED ON O.L.
TIMBER STRUTS
MIDDLE LIFT 88'-0" DIA x 20'-0" 1882
WEIGHT 30 TONS
FLYING INNER LIFT 86'-0" DIA x 20'-3" 1907
WEIGHT 60 TONS
12 C.I. COLUMNS
ANNULAR TANK 91'-6" DIA. x 20'-6" DEEP 1882
CUP CHANNEL & SKIRTING PLATE REPAIRED
NEW CUP RING
ALL CUP & BOTTOM ROLLERS RECONDITIONED
6"x8" OAK SQUARES SUPPORTING LIFTS
NEW CUP BOW
LANDING BLOCKS LEVELLED WITH PACKINGS

Fig. 1.

atomized light oil into the mains at the outlet of station governors, and this no doubt helped us with the rust problem; also, whenever laying new mains on the district, an oily rag is passed through the pipe before jointing.

A further advantage from dehydration has been the more rapid detection of leaky joints in mains and corroded services. The appearance of water in a syphon indicates a leaky joint or service. We have a peculiar case in hand at the moment. A main under a railway level crossing is dry on one side of the crossing and quite wet on the other side with water collecting in the syphon. This indicates a leaky joint somewhere under the rails, although there has been no smell or trace of gas escaping.

We have had the interior of our domestic gas meters specially watched and examined since dehydration and cannot trace any ill-effects on the leathers or on the life and registration of the meters.

It is commonly thought that with dehydrated gas from vertical retorts there is danger of trouble from gum on the district. I can only say that in our case there is little trouble on the district from gum, but this is no doubt due to the very small quantity of nitric oxide in the coal gas. It has always been our practice to work the vertical retorts under a slight pressure.

Prior to the introduction of our dehydration plant the gas was sometimes partially dehydrated in mains in cold weather due to condensation of water, which was collected in the syphons. No credit was received when the gas was tested for calorific value on the district, whereas now, with the recognized partial dehydration, the gas is corrected for dew point when tested, and we have observed a slight benefit.

## Trouble from Effluents.

The effluents from our sulphate of ammonia and concentrated ammonia plant have given us much anxiety in the past. The only outlet for the works effluent is into a tributary of the River Lea, and those who have had experience with River Conservancy Boards will realize how exacting are their regulations. The effluent must be colourless and without odour. Soon after the end of the War, the River Conservancy Board prohibited any sulphate effluent entering its tributary if it had any colour. We tried several methods for decolorizing the effluent, but unfortunately the treated effluent reacted with other chemicals as soon as it reached the tributary, or later with the outfall from the sewage works down stream, and the colour always re-developed, much to our embarrassment. Then we allowed the effluent to drain away into a large hole on the works.

About 18 months later, the coloured effluent appeared in a neighbouring ballast pit, and the difficulties that arose can be imagined when I say that the water from the ballast pit was being pumped into the tributary of the river. The Company had to pay heavy compensation, but good came from this ill wind, as we were able to negotiate for the purchase of this land. It has come in very useful since, and we were able to build our new gasholder on a portion of it instead of crowding our existing land. Also we could more than recover the compensation paid if we wished to sell the land to-day.

These difficulties necessitated the closing down of our sulphate plant in 1922, and we had to pay to send our ammoniacal liquor by rail tanks to a tar works. Carriage and other charges eventually cost us over £2,000 per annum, until in 1932 we erected, with the help and advice of Mr. P. Parrish, of the South Metropolitan Gas Company, one of the first automatically controlled concentrated ammonia plants in the country, which has worked very satisfactorily, and has since been a source of revenue.

However, our effluent difficulties were not ended. We had arranged to pass effluent from the concentrated liquor plant into the sewer, but unfortunately the brick-lined cooling pits were not quite water-tight, so that when another ballast pit was opened up in 1936, on land adjoining our works on the opposite side to the previously mentioned pit, and powerful water pumps installed, the effluent from the concentrated liquor plant, and also traces of water gas tar, which must have leaked from an old concrete water gas relief holder tank, were drawn from our land by the pumps and contaminated the lower layers of the ballast. This old holder tank has been used as a clean water reservoir for a number of years, and therefore the water gas tar must have leaked into the ground quite 15 or 20 years ago. Again we had to pay compensation, and now the effluent from the ammonia plant is cooled in iron troughs.

## The Sales Side.

Before closing this account of some of our experiences at Lea Bridge I propose to refer briefly to two or three items of interest affecting the sales side of the Company.

Until 1934 it was our practice to supply only black cookers for prepayment consumers and also for rental purposes, and those desiring a vitreous enamelled cooker had to buy through the hire-purchase system.

Our district is a typical East End working-class neighbourhood, a large percentage of consumers living in their kitchens and disliking the look of the black cooker in their living rooms. It will be appreciated that with an average consumption of only 15,000 cu.ft. per annum for our prepay-

ment consumers it was impossible to give them a modern enamelled cooker at the standard differential rate. By forcing the consumers to buy if they wished to have a vitreous enamelled cooker we certainly sold a large number for three or four years, but naturally there are a number of consumers either unable or unwilling to purchase a cooker. We found this policy helping the electric cookers to make headway by replacing our black ones, and also where consumers purchased their cookers they changed from prepayment to ordinary meters, not always to our advantage, as in some cases it gave us more debts to collect.

We experimented at first with spray painting, but this was not successful with the doors and frames or the cornices, and we decided that all parts must be vitreous enamelled. After much experimenting we were pleased to find that we could make a very successful job of vitreous enamelling old castings. Therefore, in 1934, we embarked on a policy of vitreous enamelling as many of our 25,000 black cookers as possible.

We brought in the black cookers gradually, dismantled and cleaned them ourselves, and had all the black parts, with the exception of the burners, hotplate bars, and oven shelves, sent away to be enamelled. The parts were re-assembled at the works, fitted with chromium plated taps, and the cookers sent out as re-conditioned enamelled cookers. We found them very popular and consumers who had these cookers were prepared to have their meters set back to give 1 cu.ft. of gas less per penny for the privilege of an enamelled cooker. As there was a considerable percentage of castings not worth enamelling, and a number of unpacked cookers which we have scrapped, we have purchased a fairly large number of new modern enamelled cookers at a reasonably low price, and fixed them for consumers with an annual consumption well above the average, or for consumers who have agreed to their meters being set back to give from 1 to 3 cu.ft. less per penny according to their annual consumption.

At the end of last year we had practically finished the conversion or replacement of our black cookers, having accomplished the task in about 3½ years. Altogether we have replaced about 35% of the black cookers with the abovementioned new modern enamelled cookers.

The average cost of reconditioning and enamelling the old cookers was £2 4s. for an unpacked cooker, and £2 17s. 6d. for a packed cooker.

As will be appreciated, the expense of this work has been heavy and we have had to carry a proportion of the charges to a suspense account, to be written off in succeeding years. It is interesting to note the reaction due to this change of policy in supplying enamelled cookers to prepayment consumers. In the year 1934 our net increase of prepayment meters was only 16, and the increase of ordinary meters was 851, whereas for the year 1937 the net increase of prepayment meters was 637, and the number of ordinary meters decreased by 385.

The policy can be considered successful, as most of the consumers are quite pleased with the reconditioned stove, but where consumers insist on a more modern cooker they have to pay an increased rental.

Another curious peculiarity of this Company, considering the nature of the district, is that up to four years ago we had almost exclusively only one-shilling prepayment meters, and it was mainly due to the trouble that was experienced with token discount discs issued by multiple shops in our area, which were the same size as a shilling, that we decided to introduce the dual coin meter. We had previously warned and threatened consumers using discs, but they always gave the excuse of not having a shilling available when required. Since the introduction of the dual coin meter we have found that the nuisance of discs in meters has practically stopped, and, what is perhaps more important, there is a tendency for a slightly higher consumption after the dual coin meter has been fixed.

We are now purchasing this type of prepayment meter only, and will gradually change all our meters. In the last three years we have changed 24% of our prepayment meters, a process which has been accelerated by the necessity for replacing old 3-light meters where instantaneous gas water heaters have been fixed.

There is a further experience on the sales side that I would like to mention. About seven years ago, when we were considering a small decrease in price of gas, we were somewhat concerned at the annual decline in the average consumption of gas by the prepayment consumers, so instead of reducing the price to the ordinary consumers, we reduced the price of gas to the prepayment consumers, altering the rate of their meters to give the maximum quantity per shilling, and discontinued the system of rebates, thinking that the extra quantity of gas per shilling would encourage increased consumption. The result was most disappointing. The average consumption of gas still continued to decline at exactly the same rate, and we derived little apparent benefit from the reduction.

The meters of prepayment consumers are set at different rates according to the annual consumption, and the type and number of apparatus supplied. Different rates are charged for an installation, including a black reconditioned enamel or new modern cooker respectively, and another rate where the consumer has purchased a cooker.

The following table shows the average annual consumption per consumer for each of seven different rates. It will be observed that the consumption is approximately the same irrespective of the price of gas.

| Cu.Ft. Supplied per 1s. | Average Annual Consumption per Consumer. Cu.Ft. |
|---|---|
| 180 | 15,800 |
| 192 | 14,600 |
| 204 | 15,200 |
| 216 | 14,600 |
| 228 | 15,200 |
| 230 | 15,800 |
| 240 | 17,500 |

In the light of present experience it would have been better to have reserved the amount available for the decrease in price for the encouragement of industrial consumers. At that time our industrial load was only about 5%; last year this load has risen to nearly 25%, and this change is altering the whole outlook of the Company.

## Hire Purchase of Apparatus.

Also the great increase in the number of gas appliances sold since the introduction of extended hire purchase on attractive terms has raised further problems, especially on a district of our nature. Whereas in the past our type of consumer was not interested in apparatus quoted at cash price or quarterly instalments over two or three years, they are now definitely attracted when the instalments are spread over a longer period and quoted at a low price per week. We found it easier to sell a certain gas fire at 4d. per week (including fixing and maintenance) and bringing in a gross return of over £3 than the same fire at a cut cash price of £2, including fixing, during the previous year.

The danger of this attractive hire-purchase policy is that consumers with limited means are tempted to purchase apparatus on very easy terms, and find as time passes that the payments are an embarrassment. There is a tendency for the consumer to economize on his consumption to save money to pay the hire-purchase instalment, as the total amount that he is willing or able to spend on gas and apparatus is necessarily limited. I would much prefer if it were possible for landlords to be persuaded to install apparatus as a necessary fixture in the house, and for the rental of the apparatus to be added to the weekly rental of the house. We have this arrangement on one small estate and I wish it could be adopted more extensively.

We have noticed a definite decrease in consumption of gas of those of the poorer class consumers whom we have persuaded to purchase new modern cookers to replace the old black type. Firstly, there is an economy of 10 to 20% in the higher efficiency of the modern cookers, and also a further tendency to economize to help pay for the instalments.

## Monthly Accounts.

As we were the first medium-sized Company to introduce monthly accounts you would expect me to say something of our experience. We started sending out monthly accounts at the end of 1930. When the Company first considered the question of introducing monthly gas accounts it was recognized that the additional expense, excluding the capital cost of the accounting machines, would at first be about £1,000 per annum. Considering that approximately 83% of the property on our district had at that time a rateable value not

exceeding £20, and that the majority of our consumers are weekly-paid, my Board decided that monthly accounts would be greatly appreciated, and that the benefits derived would be well worth the extra expense. Extra facilities were given to consumers for the payment of their gas accounts by arrangement for the local branches of our Bank to accept payment, using a simple receipting machine. We find that about 90% of the accounts are paid by cash at one or other of the eight places available for payment.

An analysis of the use of the available facilities is interesting:

| — | Number of Accounts Paid. | Money Value. |
|---|---|---|
| | % | % |
| Head office at works (by post) .. .. | 9·8 | 49·8 |
| ,, ,, ,, (by cash) .. .. | 3·2 | 2·4 |
| 3 showrooms (all cash) .. .. .. | 78·3 | 42·0 |
| 4 bank branches (all cash) .. .. | 8·7 | 5·8 |

The reason for the high percentage of the money value of the accounts paid by post as compared with the actual number of accounts is because of our large industrial load, and all accounts for gas for industrial purposes are naturally paid by cheque.

The change from quarterly to monthly accounts was spread over a period of several months, with the result that there was not the slightest hitch or confusion. The new bill form and the receipting system were introduced while we were still on quarterly accounts, and we fully trained our Staff on the accountancy machines, and had a whole month's rehearsal on dummy accounts before starting the monthly bills.

A very important point in a change-over to mechanized accounting is to have an ample number of machines with a liberal allowance for temporary breakdowns, and also for increase in consumers. To boost their machine, the machine manufacturers will specify the rate as worked by a skilled operator all day, without stoppages for adjustments or temporary breakdown, and if little or no margin is provided difficulties arise when delays inadvertently occur or when new operators are being trained and can only work at about half the rate of a fully trained girl.

With the old quarterly accounts we had the usual collectors, but with the introduction of monthly accounts we were able to dispense altogether with collectors. Fortunately, with the considerable reorganization of staff necessary in other departments about that time, we were able to absorb all the rental staff and collectors. We introduced young girls to operate the accountancy machines and for filing and preparing the accounts for the post. But instead of sending the bills by post they are delivered by hand, and the cost works out at about one-sixth of a penny per envelope, so that the delivery of these accounts over a period of three months by hand is costing no more than the old method of posting the quarterly accounts.

We have continuous meter reading with a regular trained staff. This we find a distinct benefit. We had comparatively very few grumblers at the change, much less than 1% of the total number of ordinary consumers. Money comes in regularly throughout each month, which is a great advantage. Consumers are not forced to pay monthly, and the following is an analysis made of the payment by all consumers for the year 1937:

| | |
|---|---|
| Consumers paying each month .. .. .. | 55·27% |
| ,, ,, ,, 2 months .. .. | 19·07 ,, |
| ,, ,, ,, 3 months .. .. | 25·66 ,, |

I consider that there are three further great advantages of monthly accounts other than those I have already given. The first is the close watch that we can keep on meters registering incorrectly, detecting them in either one or two months, whereas with quarterly accounts it was often six months before they were detected. The result is that we rarely experience disputed accounts through incorrect registration of meters. It is quite common for the meter reader to be able to agree an estimated consumption with the consumer when he first observes a meter which has stopped or is registering incorrectly.

The second advantage is where an abnormally high consumption results from either a cold spell or individual domestic reasons, such as illness in the house or a new gas appliance recently fixed. The consumer receives his bill for the additional consumption while the reason is still fresh in his mind, and this again has saved us from disputed accounts.

The third advantage is that we are able to charge for rental of apparatus, and also hire-purchase instalments, on a monthly basis. This has a psychological effect on a consumer with a small weekly income. A sink water heater charged at 2s. per month, or a gas fire at 1s. 4d. per month, appears far less formidable than a charge of 6s. and 4s. per quarter respectively.

Having pointed out all the advantages of monthly accounts for a district similar to that at Lea Bridge, where so many consumers receive their incomes weekly and pay their accounts by cash, I venture to express the opinion that monthly accounts are not so suitable, or of the same advantage for a district with a large percentage of good class property, and consumers paying their accounts mostly by cheques. I would suggest that in this case quarterly accounts with continuous reading of meters are preferable, but I say unhesitatingly that at Lea Bridge monthly accounts have been most successful and advantageous.

In conclusion, I must apologize for speaking at such length of my own experiences at Lea Bridge, and I only hope that they may be of some interest and benefit to members, and while I again thank the members of this Association for the honour they have conferred upon me in allowing me the privilege of giving this Address, I would like to pay tribute to the splendid loyalty and assistance given by the Staff throughout my long association with the Lea Bridge District Gas Company, which has helped us to build up our present position of goodwill and our reputation for good service with our consumers.

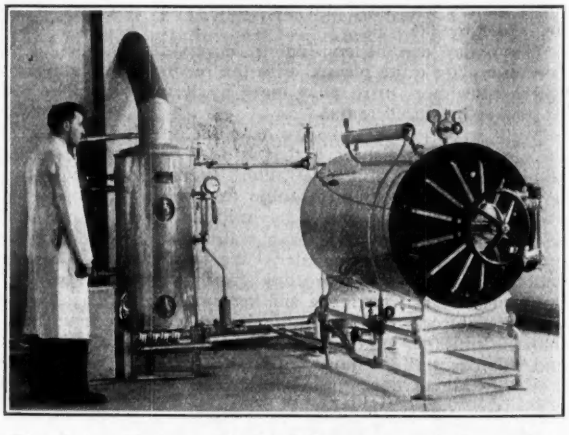
## Vote of Thanks.

A hearty vote of thanks to Mr. Cross for his Presidential Address was proposed by Mr. R. ROBERTSON (Bristol), who remarked that those of them who knew his father would agree that he was following in his footsteps in an admirable manner. The points he had brought out in his Address would form a valuable guide to all of them. The developments he had referred to might be regarded as synonymous with the progress of the Gas Industry.

The vote of thanks was supported by Mr. L. J. LANGFORD (Tunbridge Wells), who observed that the members were very happy to see Mr. Cross occupying the position which his father, whom they admired so much, occupied 32 years ago.

Mr. CROSS briefly acknowledged the vote, saying that he thought it might be helpful to them if he recounted some of their experiences at Lea Bridge—not only such successes as they had achieved but also their failures. Once again he thanked them from the bottom of his heart for their attendance and support.

## Brockhouse Boiler and Sterilizer



This photograph shows a No. 2-V.S. Brockhouse gas boiler coupled to a Manlove-Alliott sterilizer, working at 20 lb. pressure in the jacket. This pressure is attained from cold in 70 to 75 minutes. The operation of sterilizing is carried out over a period of 75 minutes, and 60 lb. pressure is maintained on the boiler throughout. The average time taken for securing this pressure on the boiler is 30 minutes. This installation was carried out by the Industrial Section of the Manchester Corporation Gas Department.

# Tar Reconditioning Plant for M.A.N. Waterless Holder

by
D. J. WARD,
of Birmingham

From a Paper read before a meeting of the Midland Junior Gas Association held at Birmingham on March 3—the PRESIDENT (Mr. E. T. Pickering) in the chair.

About 1929 it became apparent that the storage capacity of the Swan Village Works of the Birmingham Corporation Gas Department should be increased, and the problem as to which was the best way of doing this naturally asserted itself. There were in existence two holders, one of 2 million and the other of 1 million cu.ft. capacity. As the latter was nearing the end of its useful life, it was decided that it should be demolished and replaced by one of larger capacity. The final decision was for the installation of a 4 million cu.ft. waterless holder of the M.A.N. type, and this was erected and put into commission in December, 1930.

It is not proposed to give a detailed description of the holder in question, because the general features are so well known, but for the better understanding of this Paper a few remarks must be made on the general arrangement of the tar chambers and the amount of tar in circulation.

The piston is sealed and made gas-tight round the periphery by means of tar carried in a continuous canvas or sailcloth cup, the latter being fastened on one side to the piston decking, and on the other to steel rubbing strips which are pressed against the inside of the holder sheeting by weights on lever arms. Thus the piston floats on the gas and is sealed all round its sides by what almost amounts to a flexible tar dam. Any tendency of the piston to revolve is prevented by the shape of the shell, which is not circular but has 22 sides, the junctions of which carry 6 in. by ½ in. steel flats, up and down which travel the top and bottom wheels of the piston structure. The tar from the seal slowly leaks past the rubbing strips down the sides of the holder into a common dam running round the inside at the base. From the dam the tar overflows through six adjustable weirs into six settling or collecting chambers spaced equally round the holder on the outside. From each collecting chamber the tar passes under a division plate to a second chamber, and thence via two pipes fitted with adjustable weirs to two float chambers from where it is pumped by small electrically driven rotary pumps up a vertical 3 in. pipe to the top of the holder sheeting into the reserve tanks.

Each pair of reserve tanks is provided with serrated overflows actually discharging on to the inside of the holder, and the tar runs down the walls in several adjacent streams into the seal. Thus the latter is maintained at a fairly constant level. The pumping is done automatically as the twelve electric pumps are started and stopped by trip mechanism operated by the floats themselves. Thus, as a float chamber becomes full, so the pump is tripped in, and it continues to run until the tar in the float chamber is down to its lower level when the pump is tripped out. The number of times each pump operates is registered on a counter, and this will henceforth be referred to as the number of "pump runs." The function of the top reserve tanks, which are always full, is to provide a quick supply to the seals in case of emergency.

The distribution of the tar is as follows:

| | Galls. | Tons. |
|---|---|---|
| In tar dam .. .. .. .. | 4,400 | 22·0 |
| In collecting and float chambers .. | 2,500 | 12·5 |
| In top reserve tanks .. .. .. | 2,500 | 12·5 |
| In tar seal .. .. .. .. | 4,800 | 24·0 |
| In vertical pipes .. .. .. | 600 | 3·0 |
| Total .. .. .. | 14,800 | 74·0 |

A further 12 tons adheres to the sides of the holder, so that 86 tons in all were required for introduction into the seal and various chambers before the holder was put to work. In addition 80 tons of dehydrated tar were used for covering the bottom plates to a depth of a little under 2 in. It must be remembered that at this time little reliable information was forthcoming on the subject of sealing tars for waterless holders, and therefore great care and consideration were necessary before making the final choice. It was realized that a suitable tar for the job should not be too thin; remain constant in composition; have a high specific gravity; be free from emulsion; and should not evaporate.

Finally the requisite amount of sealing medium was purchased to Specification "A" of the Patentees, with a specific gravity at 20° C. of 1·122, and viscosity Engler at 50° C. of 6 to 7. The base material was dehydrated tar from vertical retorts with a small percentage of water gas tar, the latter being added because its viscosity does not vary with variations in temperature as much as does that of coal gas tar.

## Working of the Holder for the First Two Years.

The holders on an average gas-works as a rule are not emptied and filled very quickly, because it is usual to have storage capacity for at least one day's maximum "make," and this was the case at Swan Village. Thus the waterless holder was fairly full on a Monday morning and gradually emptied to a low stock by the following Friday, after which the "make" gained over the "output" for the Saturday and Sunday, so filling the holder again by the Monday morning. This meant that the piston descended and ascended only once per week, and as a result the atmosphere inside the holder above the piston was not frequently changed, although there appeared to be ample ventilation in and around the roof. High winds, however, aided the introduction of air, but even so, at times during the summer months when the temperature was high, conditions were far from pleasant if one had to spend any length of time on the piston. This was probably due to the following:

The sealing tar originally contained very little benzole vapours and light fractions up to, say, 160° C., and as a result the tar on the walls below the piston to a certain extent absorbed these from the gas during the winter months. On the approach of summer the temperature rose, and as the walls of the holder became hotter than the air above the piston the benzole vapours were given up, causing a bluish haze to appear when looking down from the top platform. This was distinctly unpleasant, causing headache and smarting of the eyes, particularly to anyone not accustomed to the interior of the holder, whose duties took him inside for any length of time—*e.g.*, for the purpose of taking tar samples, temperatures, testing the atmosphere, changing level charts, and the like. As would be expected, the atmosphere on the piston was clearer than that at the top landing level, as the vapours tended to rise into the roof, and so anyone who had been engaged on the piston, on coming up the stairway was ascending into a worse atmosphere as he neared the top platform.

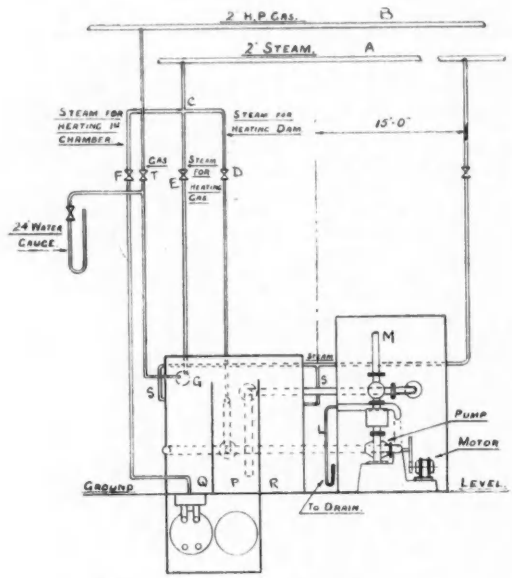
Towards the end of 1932 the tar was in a bad condition being very thin and more or less of an emulsion, with a high water content and a low flash point. One particular sample taken during the summer flashed at 80° F., which was below the temperature of the atmosphere above the piston at that time. During the winter, although the water on top of the tar in the seals was skimmed off as much as possible, particles of ice were seen during a very cold spell. This was, of course, dangerous, and the ice was at once removed.

After the holder had been in commission for about two years, conditions were such that it was decided that the tar must be reconditioned or changed and/or the ventilation of the atmosphere above the piston greatly improved. In connexion with the latter, blowers, ventilating shafts, and similar expedients were considered impracticable, and the cost of completely changing the tar was heavy, and even if this had been done, the same conditions would probably have ob-

tained again at a not very distant time. A separate reconditioning plant was seriously considered, to be erected at some distance from the holder, and so arranged and worked that all the tar could be removed from the holder a little at a time, treated, and returned in a condition suitable for further service. This latter idea, though excellent in theory, was not economically practicable, and would have been a most expensive way out of the difficulty because, in addition to requiring, say, another 40 tons of tar, great expense would be incurred by the initial cost of the plant, upkeep, and technical supervision. Finally it was decided to follow on the lines of Messrs. Langford & Tooby, of Coventry, who had done considerable work in connexion with the problem of the reconditioning of tar, and at that time had an experimental plant in operation at Coventry.

## L. & T. Tar Treatment Plant: Patent No. 407,534.

*Principle.*—Use is made of the circulating pipes in the dam originally intended for warming the tar at this point by pumping round tar warmed in the first collecting tank by means of gas heaters. These latter are disconnected and steam heating is introduced. Thus warmed tar is continually overflowing the weir from the dam to the first collecting tank on the




Waterless Gasholder Tar Re-conditioning Plant.

ground level. A warmed gas pipe is introduced beneath the weir pipe, so that warm gas may bubble through the tar, the end of the pipe being sealed to a depth of from $\frac{3}{8}$ in. to $\frac{1}{2}$ in.

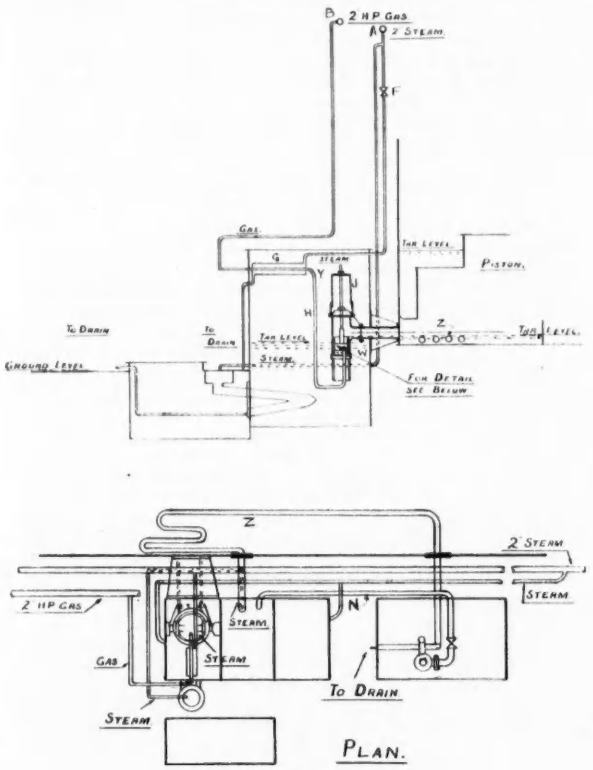
The warm tar gives up its benzole and water vapours, which are taken up by the warm gas stream and returned to the gas beneath the piston, the warm gas being introduced at a sufficient pressure to overcome the seal of tar in the inlet pipe and the pressure of gas thrown by the holder. The idea, though simple, was very efficacious, as are so many clever inventions. The necessary licence was obtained, and the erection of the plant was commenced early in 1933.

## The Swan Village Installation.

It was estimated that 800 cu.ft. of gas per hour would be necessary to be delivered to each set of tanks round the bottom of the holder, and, as there are six sets, a gas compressor was ordered, capable of delivering 5,000 cu.ft. per hour against a pressure of 24 in. W.G. By throttling down on the delivery, this pressure could be increased, if necessary, to 5 lb./sq.in.

Pending the delivery of this plant a small air compressor was temporarily fixed up, this being steam driven, and of the single stage direct piston type, designed to work at 80 lb./sq.in. pressure. This latter was much too high, so a reducing valve was fitted on the outlet of the receiver, and a further reduction was effected by introducing a by-pass pipe with a cock between the inlet and outlet of the compressor itself. The gas supply came from the holder via the pipes originally used to supply the gas heaters, which were now disconnected.

Two 2 in. ring mains—one for gas and one for steam—were fixed right round the holder at a convenient height, with droppers to supply each set of tanks. The 2 in. gas main was connected to the outlet compressor, and was fitted with three pressure gauges equally spaced round the holder, so that when the reconditioning plant was put to work the gas main could be kept charged to the requisite pressure. The fixing of the 1 in. U-pipe beneath the weir presented some difficulties before satisfaction was obtained, and several pipes were made before the final one was pronounced satisfactory. Its length was determined by dipping the tar in the tank and also the tar inside the weir pipe J through a plug-hole in the top. The difference in levels—about $7\frac{1}{2}$ in.—was, of course, due to the pressure of gas in the holder being on the tar




inside pipe J, while atmospheric pressure obtained outside. The end of pipe H was fixed about $\frac{1}{8}$ in. under the tar level in the weir pipe, the open end being sealed with a plug which was welded in, and the gas was forced to bubble through three horizontal rows of $\frac{3}{16}$ in. holes drilled near the end at W.

From the 2 in. steam main a $\frac{1}{2}$ in. pipe led down to a $\frac{1}{2}$ in. cross at C, carrying three $\frac{1}{2}$ in. valves, that at D supplying the tar heater in the dam, that at E supplying the steam heated jacket round the gas pipe at G, and that at F the steam heater in the first tank. This latter was the original gas heater, except that the gas service was removed, the burner openings blanked off, and a $\frac{1}{2}$ in. steam pipe run from the centre of the blank to an outside drain. The cowl on the outlet gas heater was removed, blanked off, and a $\frac{1}{2}$ in. steam service led in. Finally the heater pit was filled with sand, the outlet of the steam jacket was carried to the front of the first tank and away to a drain, and the outlet of the heater in the dam was carried through the side of the motor cabin and away. It was thought that traps would be necessary on all the heater outlets, but this proved undesirable because in

each case a mere crack on the steam valves was sufficient to maintain the necessary temperatures, so that 8 in. syphon pipes replaced the traps, and very successfully kept the heater pipes full of hot water and steam.

The connecting up of the heater in the tar drain was a ticklish business, great care being necessary to make all joints good. The original delivery from the tar pump into tank P was disconnected, and the elbow turned round so that it was facing upwards to receive the steam service from valve D. The pump was disconnected from its delivery to the dam and the latter was extended through the side of the pump cabin to the syphon outside, beforementioned. A tar pipe was then run along behind the tanks, connected by a valve in the pump cabin to the vertical discharge pipe, its other end terminating in a bend looking down into tank P. By this means tar from the vertical discharge pipe could be run back into the tank P, if for any reason this was desirable.

## First Effects of Reconditioning.

The first particularly striking point which was noticed immediately each set was put to work was the condition and appearance of the tar in the first collecting tank. Large quantities of water were separated out on top of the tar, and were skimmed off by ladle and bucket and taken away. The automatic water skimmers provided by the makers in tank Q proved of very little practical use, and were disregarded. The pump runs increased for about a fortnight, after which they came back to a few per day due to the fact that the tar had cleaned up considerably, with a consequent rise in viscosity. The number of pump runs was very high in July and August, 1932, running into hundreds per day, this being due to the fact that the tar was very thin with a high water content, together with a high atmospheric temperature. It is doubtful if there was much proper circulation, because the same tar was simply running into the seal, from the seal to the dam, and back to the seal so quickly that the majority of the tar in the holder was not being circulated at all. When the reconditioning plant had been in operation some little time, real control over the tar circulation was obtained, and pump runs were brought down to as low a figure as ten per day. There are about 15,000 gallons of tar in the holder, of which perhaps only 10,000 gallons are actually in circulation, because there is a certain amount of dead stock in the bottom of the seal below the step, and in the bottom of the float chambers. Allowing for 25 gallons being elevated per pump run, then 400 runs should be necessary before the useful tar in the holder has been reconditioned. This figure is only of theoretical interest, as in practice it is found that, although the dam is common, the tar does not flow round it to any extent and even with constant and careful supervision of the reconditioning plant, it is impossible to keep the pump runs at each section a constant percentage of the whole.

Although by the beginning of 1934 no hard-and-fast rules could be formulated for the most efficient working of the plant, it was, however, definitely agreed that the plant was doing its job, because the atmosphere above the piston was, on the average, much clearer, and the composition and appearance of the tar had improved. The water was daily skimmed off each first settling tank, the total for the week being recorded. Generally speaking it was found that the amount varied from 100 to 500 gallons total per week from all the six sections, some of the highest totals being reached in the summer months.

| | Before Starting of Plant. | | After Plant had been Working for about Three Months. | |
|---|---|---|---|---|
| Position .. .. .. | Seal. | Float Chamber. | Seal. | Float Chamber. |
| % $H_2O$ .. .. .. .. | 3·2 | 4·0 | 2·0 | 3·0 |
| Distillation up to 70° C. .. .. | 0·3 | 0·1 | — | — |
| ,, ,, 80° ,, .. .. | 0·9 | 0·8 | 0·2 | 0·2 |
| ,, ,, 90° ,, .. .. | 1·2 | 1·2 | 0·4 | 0·5 |
| ,, ,, 100° ,, .. .. | 1·8 | 1·5 | 0·7 | 1·0 |
| ,, ,, 110° ,, .. .. | 2·2 | 1·8 | 1·0 | 1·5 |
| ,, ,, 120° ,, .. .. | 2·7 | 2·4 | 1·5 | 2·0 |
| ,, ,, 130° ,, .. .. | 3·1 | 3·0 | 1·8 | 2·7 |
| ,, ,, 140° ,, .. .. | 3·8 | 4·1 | 2·3 | 3·3 |
| ,, ,, 150° ,, .. .. | 5·8 | 5·5 | 3·0 | 4·1 |
| ,, ,, 160° ,, .. .. | 8·5 | 7·6 | 4·1 | 5·3 |
| Viscosity at 60° F. (secs.) .. .. | 2·8 | 3·0 | 19·0 | 12·4 |
| Flash point, ° F. .. .. .. | 76 | 78 | 116 | 103 |

After a few months' working the tar distillation up to 160° C. showed a great improvement, as the following weekly average tests show. The flash point and the viscosity had risen, thus pointing to improved working and better conditions.

## General Results and Remarks on the Working of the Plant.

If the tar is overtreated, as it were, the flash point becomes unnecessarily high, and the viscosity such that the tar is very sluggish, and its travel is slowed down to such an extent that pump runs may cease altogether for two or three days at a time. Viscosities in the region of 35 seconds have been recorded, and in cold weather this makes it almost impossible for the pumps to lift against the standing head of about 210 ft. A gauge on the pump delivery showed as much as 95 lb./sq.in. pressure under such conditions, causing the pump to run for three or four minutes after tripping in, before the float started to descend, or, maybe, tripping out on overload before any tar had been delivered. This was obviously to be avoided, and the remedy was to check the gas and/or the steam pressures to the gas heater until the tar became less viscous. At other times pump runs ceased because the tar in the dam would not overflow the weir, or because there was a blockage in the nature of some thick mass in the dam opposite the outlet to the weir pipe. This was overcome by increasing the amount of steam to the heating coils Z, and/or by lowering the weir (which it should be remembered is adjustable) $\frac{1}{8}$ in., $\frac{3}{16}$ in., or $\frac{1}{4}$ in. as the case demanded. After one or all of these remedies had been applied, pump runs almost invariably recommenced.

It is impossible to give exact settings for the valves to suit the varying conditions during the different seasons. The steam to the heaters was checked, increased or shut off as the tar tests or pump runs indicated, and so also was the pressure of gas to the U-pipes. This latter pressure was usually between 12 in. and 20 in. w.g., while the steam pressure was such that a little hot water was continually running from the syphon on the outlet heaters.

Certain sets of tanks on one side of the holder felt the effects of the prevailing winds, and particularly in the colder weather, the conditions for reconditioning the tar in them were different from those on the more sheltered side. Again, in the summer months one side of the holder received the majority of the sun heat, and conditions in various sets were different and the settings altered to suit. In fact, in very hot weather the temperature of the side plates was such that the tar on the inside walls, being in a very thin layer, had given up its benzole vapours before reaching the dam, with the result that the reconditioning plant on certain sections was practically useless, and was shut down until again required.

| | Week Ended Saturday, 7/7/34. | | Week Ended Saturday, 10/11/34. | |
|---|---|---|---|---|
| Position .. .. .. | Seal. | Float Chamber. | Seal. | Float Chamber. |
| % $H_2O$ .. ... .. .. | 3·2 | 3·8 | 4·2 | 6·2 |
| Distillation up to 70° C. .. .. | 0·1 | 0·1 | 0·1 | 0·3 |
| ,, ,, 80° ,, .. .. | 0·5 | 0·5 | 0·5 | 1·7 |
| ,, ,, 90° ,, .. .. | 0·9 | 0·8 | 1·2 | 2·2 |
| ,, ,, 100° ,, .. .. | 1·1 | 1·2 | 1·6 | 2·7 |
| ,, ,, 110° ,, .. .. | 1·5 | 1·6 | 2·0 | 3·5 |
| ,, ,, 120° ,, .. .. | 1·9 | 1·9 | 2·4 | 4·1 |
| ,, ,, 130° ,, .. .. | 2·4 | 2·2 | 2·8 | 5·0 |
| ,, ,, 140° ,, .. .. | 2·8 | 2·6 | 3·3 | 5·8 |
| ,, ,, 150° ,, .. .. | 3·4 | 3·3 | 3·9 | 7·0 |
| ,, ,, 160° ,, .. .. | 4·1 | 4·0 | 4·6 | 8·0 |
| Flash point, ° F. .. .. .. | Over 120 | 110 | 108 | 80 |
| Viscosity at 15° C. (secs.) .. .. | 26·5 | 17·8 | 17·3 | 6·5 |

A period such as described above was from July 1 to Nov. 10, 1934, when the compressor was shut down, but the steam heaters were used a little on a few occasions during these months. A comparison of the weekly average samples at the beginning and end of this shut down are interesting and informative.

It will be noticed that one flash point is recorded as "over 120° F." The flash point test was not carried beyond this

figure for routine purposes, and if the tar had not flashed by 120° F. the result was entered on the sheet in the above manner.

## Maintenance of Seal.

This is an important point and must be given constant attention. At Swan Village the seal is dipped down to the step in six positions, three times a week, on Mondays, Wednesdays, and Saturdays, and recorded in the holder record book.

The seal is divided into twelve sections by twelve canvas bulkheads stretching across the seal itself, and for the latter to be common the dip to the step should not be less than 5 in. with a latitude of ¼ in. either way. If it falls below this figure it is obvious that the tar level of those sections of seal not replenished direct from the tar pumps may fall so low as to be a source of danger in that gas may escape from below the piston. Hence it is imperative that when the dips are approaching the point when the seal is not common, then new tar must be put in until the dips are increased sufficiently to show a safe margin again. A quantity of 1,000 gallons of tar increases the depth of seal by about 2½ in. in a 4 million cu.ft. capacity holder.

## General Conclusions.

It may definitely be said that such an installation as that which has been described improves the condition of the sealing medium in an M.A.N. waterless gasholder, with the result that the atmosphere above the piston is maintained in a sufficiently pure state to allow of a person remaining inside for long periods without any inconvenience. From personal experience of many hours spent on the piston over a period of several years, I can truthfully say that the difference before and after the plant was put to work was most marked. A particular instance of this was in 1934 when it was necessary to repaint the piston. This work was carried out by the works' painters over a period of several weeks, the men working each day for the full number of normal working hours without any sign of discomfort or distress. In this connexion it is important to remember that in order that the holder may throw the requisite pressure, the piston is loaded with several hundred concrete blocks, each weighing about 2 cwt. In the case of the Swan Village holder there are roughly 2,500 such blocks, and in order to paint the piston decking beneath them, each one had to be removed, the plates beneath cleaned, where necessary, with a wire brush, certain sections red-leaded, and the whole treated with two coats of finishing paint. The blocks are arranged in sixteen rows round the edge of the piston, and all of them were carried clear to a position nearer the centre, until the paint had been applied and had dried; they were then replaced in their original positions. This called for much arduous work, which, quite frankly, could not have been carried out with anything like the ease and despatch had not the atmosphere above the piston been in good condition.

The general conditions which are aimed at to give the best results as regards the sealing medium and the atmosphere above the piston are as follows:

| | |
|---|---|
| Temperature of tar in first collecting tank .. | 80° to 120° F. |
| Percentage water in tar as low as possible .. | Maximum 8% |
| Viscosity of tar in summer not above .. .. | 25 secs. at 15° C. B.R.T.A. |
| „ „ „ winter „ „ .. .. | 10 „ „ „ „ |
| Flash point of tar in summer .. .. .. | Not less than 100° F. |
| „ „ „ „ winter .. .. .. | „ „ „ 80° F. |

Specimen distillation up to 160° C.—

| | |
|---|---|
| Up to 70° C. .. .. .. .. .. | *Nil* |
| „ 80° „ .. .. .. .. .. | 0·5 |
| „ 90° „ .. .. .. .. .. | 0·9 |
| „ 100° „ .. .. .. .. .. | 1·1 |
| „ 110° „ .. .. .. .. .. | 1·6 |
| „ 120° „ .. .. .. .. .. | 2·0 |
| „ 130° „ .. .. .. .. .. | 2·5 |
| „ 140° „ .. .. .. .. .. | 3·0 |
| „ 150° „ .. .. .. .. .. | 3·6 |
| „ 160° „ .. .. .. .. .. | 4·8 |

When buying new sealing tar the following points in the specification should be borne in mind:

| | |
|---|---|
| Viscosity at 0° C. B.R.T.A. .. .. | Not more than 20 secs. |
| „ „ 15° C. „ .. .. | About 5 secs. |
| Not above 2½% tar acids in fraction above 270° C. | |
| No naphthalene or $H_2S$ | |
| S.G. as high as possible over 1·0 | |

## Safety Precautions for Waterless Gasholders.

Before completing this Paper mention must be made of some recommended precautions for the safe working of waterless gasholders, whether fitted with reconditioning plants or not. There are many such suggestions which have been put forward during the last few years, but it will suffice briefly to enumerate those actually in force at the Swan Village Works.

One-inch connexions are made from the ring steam main round the holder to tanks Q and R in the diagram, the operating valve being 15 ft. away from tank R. In case of fire tanks Q, P, and R can be instantly flooded with steam.

Those portions of the inlet and outlet gas main pits actually beneath the holder base are packed with sand.

Four piston level indicators fitted with weekly charts, working in pairs and situated near the edge of the decking at each quarter of the circumference, record the tilt of the piston. The maximum difference in level allowed is 1¾ in. This is checked over and entered in the log book each Monday, Wednesday, and Saturday.

The hoist originally fixed on the top platform has been removed to a convenient position on the roof so that it can be operated from outside the holder.

A special stretcher, so that the patient can be supported and lifted in a vertical position, is housed in a wooden box on the piston together with a 250 ft. ½ in. hemp rope. If anyone, for example, sprained his ankle while on the piston and thus was unable to ascend the staircase, he could be fastened to the stretcher and elevated to the roof in perfect safety. The hemp rope is, of course, for steadying purposes.

For use in an emergency there is a telephone communicating from the holder top to a suitable position on the ground level, where there is always someone to answer a call.

All persons entering the holder must wear rubber soled shoes or rubber overshoes, and must not carry matches or automatic lighters.

When anyone descends to the piston a lookout man is stationed on the top platform level and remains there until the other man has finished his work on the piston and has ascended the staircase.

No two people are allowed on the same stairway at the same time.

When oiling or greasing the collapsible staircase a safety belt of approved pattern is worn.

If it is necessary to take any tools inside the holder these are carried in a bag securely tied, and only rawhide hammers are used—*e.g.*, if any caulking of joints has to be done.

The enforcement of the above regulations, together with the intelligent working of a tar reconditioning plant as outlined in this Paper, ensures conditions such that the holder can be worked without fear of accident, and all necessary work in and around can be carried out in safety and comfort.

## Discussion.

The CHAIRMAN said great things were expected from the waterless holder, not only because of its intrinsic value, but also because it was a break from tradition, and it was hoped that it might stimulate advances in other directions. Speaking personally, he was not quite sure that the advance had been as great as one had hoped for. He well remembered visiting Coventry in 1930 to see their M.A.N holder, and being impressed with such a fine engineering structure. He visited it again about 1933, and then or a little later Messrs. Langford & Tooby were experimenting with their ingenious and simple device for returning to the underside of the piston the hydrocarbon vapours which had been absorbed by the tar. He would like to know if the small proportion of water gas tar that was added had an appreciable effect on the viscosity of the whole, and also how much labour was required to carry out the routine day-to-day maintenance and testing operations in connexion with the holder.

Mr. A. W. ATTWOOD (Coventry) proposed a vote of thanks to Mr. Ward for his Paper. He said the installation of the reconditioning plant described by Mr. Ward had been found to be satisfactory at Coventry. Before its installation the tar had been very thin and leakage past the piston was excessive, causing daily pump runs in the region of 400. The reconditioning plant had brought this down to normal and the tar was in good condition. They found it necessary to work the plant only during the winter months. The original tar was still in use, and they had not had to replace it with new; since reconditioning had been done, the atmosphere above the piston had been clear.

Mr. J. H. GEE (Birmingham), in seconding, said the fact that such a process was necessary at all had to be put on the debit

side of an M.A.N. waterless holder, but it should be pointed out that if the holder were worked on dry stripped gas, as was usual in Germany, no such plant would be necessary. Referring to the toxic atmosphere above the piston, there had never been any coal gas there at any time, and the atmosphere had not been actually poisonous; in fact, the limit indicated in Home Office Regulations for the atmosphere of workshops where benzine solvents were used had not been greatly exceeded, even under the worst conditions. That was, of course, before the installation of the plant, but since reconditioning had been resorted to, the vapours were practically *nil*.

Mr. H. WYNNE (Burton-on-Trent) said he would like to know what had been the experience in the case of a waterless holder working on horizontal gas alone, because an instance had come to his notice where one had worked for seven years on horizontal gas, and although the tar had not been reconditioned, everything appeared in first-class order.

Mr. S. C. BENTLEY (Leicester) asked whether any means were adopted to scrape the inside of the shell periodically in view of the presence of tar which did not run down.

Mr. F. J. BENGOUGH (Birmingham) asked for particulars of the drop in C.V., if any, of the gas going into the holder.

Mr. F. N. TIDBALL (Coventry) said that an engineer had told him that for some years he had had no trouble with the tar in his M.A.N. holder, but that was due to the fact that it was working entirely on horizontal gas.

### The Author's Reply.

Mr. WARD, in reply to the discussion, said that the necessary labour amounted to one man full time, and two chemists approximately two days per week. He agreed, in the case of dry stripped gas, troubles with the tar should be non-existent.

Mr. Gee had referred to the Regulations governing the atmosphere in workshops, but it should be realized that the conditions in a shop were hardly comparable with those on the piston of an M.A.N. holder, because of the exertion necessary to climb the staircase. Mr. Ward said that everyone had his own opinion of the relative merits of different types of holders, but he would like to point out that many water sealed holders had been in use for fifty or sixty years, and the maintenance had been comparatively small. He mentioned that on a small works having an M.A.N holder the attention necessary for a reconditioning plant might be difficult. There was, of course, the big point of constant pressure, which was an important consideration in the case of small works.

Answering Mr. Wynne, he said that he had had no experience of a tar sealed holder working solely on horizontal gas. It seemed reasonable to expect that unsaturated hydrocarbons would be absorbed from horizontal gas, but possibly owing to some difference in the nature of the hydrocarbons the results might be different from those with vertical gas.

Replying to Mr. Bentley, gas drying alone would not, he thought, do away altogether with the necessity for a reconditioning plant. It had never been found necessary to scrape the shell, this being done by the piston in its travel.

In answer to Mr. Bengough, he said that before the plant was put to work, a small average drop in C.V. between inlet and outlet gas had been noticed. This had become less since reconditioning the tar, but, of course, temporary seasonal variations still occurred.

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## London and Southern Juniors

### Visit to Harvey's Works

A most interesting afternoon was spent on Wednesday, March 23, by members of the London and Southern District Junior Gas Association at the works of Messrs. G. A. Harvey & Co. (London), Ltd., Woolwich Road, S.E. 7.

It came as a surprise to those unfamiliar with the neighbourhood to find so large a works in that part of the world, and it was, perhaps, an even greater surprise to many to see the vast number of different products manufactured by this firm. Indeed, there appear to be very few types of industrial sheet metal work they do not produce, while they turn out woven wire of various mesh for so many different purposes that it takes a 70 page catalogue adequately to cover them. Among these, of course, are hard quality steel woven wire screens for coke grading plant—specially designed to withstand both abrasion and mechanical fatigue. Their wire meshes vary from coke screens and machine guards down to the finest wire cloth for filtering and similar purposes, the latter woven on machines like looms.

Then there are perforated metals, stamped out on enormous presses; these products are supplied for screening, grading, separating, and filtering, and for ornamental patterns for radiator covers, pipe guards, grilles, and ventilating panels. The firm's sheet metal products range from air ducts, ventilators, coal bunkers, and hoppers to cattle troughs and the mundane dustbin, while galvanized goods of many descriptions are manufactured, including cast and wrought iron furnace pans, tanks, pipe fittings, and manhole covers. Zinc and copper work cover dormers, turrets, ventilators, weather vanes, gutters, &c. Steel office equipment is another of Messrs. Harvey's well-known lines, among which are filing cabinets, racks, lockers, and cupboards. It is impossible to mention a fraction of the many products, the manufacture of which was witnessed by the visitors.

Of the larger products, many are used for various purposes on gas-works, including pressure vessels, benzole stills and coolers, tar stills, and storage tanks. One example of the last named made and erected by the firm is 40 ft. high by 82 ft. 6 in. in diameter and has a capacity of about 1,350,000 gallons. Also manufactured by the firm are I.C.I. gas-heated de-greasing plant as used by many gas undertakings for appliance renovation work.

A fine laboratory, testing, and X-ray plant are maintained by Messrs. Harvey, where metal work and welds are subjected to the most stringent examination and tests to conform to Lloyd's and other specifications. A good deal of gas is employed at the works for annealing and other furnace work. One gas furnace, which is understood to be one of the largest of its type in the country, is 11 ft. wide and consumes 40 therms an hour on full load. This has a removable roof, and large apparatus is let down into it from above and heated to 650° C. (Higher temperatures can be attained if necessary.) This furnace is so designed that the door can be lifted out of its slots and lowered into another position which enables only the rear half of the furnace to be utilized for smaller apparatus, thereby saving gas.

Following the tour of inspection the Association were entertained at high tea, when Mr. E. R. CLARKE (Director) offered them a hearty welcome and said how pleased the firm were to afford them the opportunity of visiting the works. He trusted their visit had been interesting and profitable and paid tribute to the South Metropolitan Gas Company for their assistance and for showing them how many uses gas could be put to.

The President of the Association (Mr. R. N. LEFEVRE) voiced the thanks of the members for a most interesting afternoon. Messrs. Harvey, he said, were an old-fashioned firm—or perhaps he should have said a *good* old-fashioned firm—because in spite of the hurry and bustle of modern business life they had not forgotten how to be courteous and kindly and to give service to their customers. In their dealings with his own Company they took the greatest trouble when advice was wanted, and he would like to take that opportunity of thanking them for the help they gave. They had seen a wonderful works that day. Messrs. Harvey had excelled themselves, both in the way they had shown the members round and in their generous hospitality. He asked the firm to accept the Association's best thanks for a very pleasant afternoon.

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## Gaslight for Coffee Roasting

The current number of the South Metropolitan Gas Company's *Co-partnership Journal* describes an interesting installation of gas lighting in a tea and coffee factory in Tooley Street, Bermondsey. It might be thought that the roasting of coffee beans is a very simple, mechanical affair, calling for little thought or trouble. But this is not so. The colour and flavour of the coffee, which are of such great importance, depend upon the "depth" of the roast, and experts are kept busy testing the beans as they are being roasted to ensure that the refreshing aroma and taste are retained.

One of the most important tests is for colour, and the difficulty arose about the provision of an artificial illuminant during hours of darkness. After experiments had been made with several forms of lighting it was found that gas with the "daylight" mantle gave a light nearest the quality of the daylight coming from the windows, and so made perfect matching possible at all times of the day.

The installation consists of five "Swanley" C/557 lamps with "daylight" mantles and provides 15 foot-candles at the shute in each machine and 8 foot-candles in the cooler. In addition to being the most adequate form of lighting gas was also found to be the cheapest.

# Women's Gas Council

## National Union of Teachers' Margate Conference.

Miss Halpin has been invited to address the Domestic Science Section of the National Union of Teachers at their Margate Conference on Wednesday, April 20, when a selection of Gas Industry films will be shown.

## Annual Meeting of the Cardiff Branch.

On March 8 the Annual General Meeting of the Cardiff Branch of the Women's Gas Council was held in the Reardon Smith Lecture Theatre, Museum Building, Cardiff. After the usual business of the meeting a talk was given by Mr. T. B. V. Hirst, of Ascot Gas Water Heaters, Ltd. This was followed by a raffle for three "Ascot" sink water heaters, supplied by Ascot Gas Water Heaters, Ltd., and, through the kind co-operation of the Cardiff

Gas Light and Coke Company, are to be fixed free of charge. The Lady Mayoress of Cardiff, Mrs. Purnell, drew the numbers from a drum, and our photograph shows her presenting the prizes to the holders of the winning tickets. In the background left to right are the Chairman of the Branch (Mrs. Eric Evans), Mr. Hirst, and the Secretary (Miss A. M. Mathias). The total attendance was nearly 400.

## New Branches.

We learn that the Women's Gas Council is forging ahead in Lancashire, where during the last few weeks branches have been started at Prescot and Leyland. The first week in April will see two further Inaugural Meetings—at Leicester on April 6 and at Swindon on April 8. Plans are also in preparation for a branch at Crouch End.

## Ideal Home Exhibition.

The official visit of the Women's Gas Council to the Ideal Home Exhibition will take place on Monday, April 11, when parties from Southend, Forest Gate, Worthing, Harrogate, and several other centres will visit the Exhibition and meet for tea. A further visit will be paid on Thursday, April 21, by branches of the Wandsworth Home Service Association.

# Athletic and Social

## Suburbagas Social and Athletic Club Dinner.

A very enjoyable evening was spent recently at the Royal Bell Hotel, Bromley, by members and friends of the Suburbagas Social and Athletic Club—the sports organization of the South Suburban Gas Company. Mr. T. H. Day (Chairman of the Club) presided, and among those present were Mr. T. Brown (General Manager and Secretary), Mr. V. Simmonds (Engineer), Mr. J. A. Gould (Distributing Engineer), Mr. B. P. Bezant (Sevenoaks and Tonbridge Works Superintendent), Mr. D. W. Evans (Bromley District Manager), together with officials of the various sports sections.

After dinner the Chairman offered a warm welcome to their guests, and said they were specially honoured by the presence of Mr. and Mrs. T. Brown. He asked Mr. Brown to convey to the Directors the best wishes of the Club for the future prosperity of the South Suburban Gas Company.

The Football Cup won by the Suburbagas Team last season in the Bromley League (Division II.) was filled and passed round for the members to drink to the prosperity of the Club, and the evening concluded with dancing and entertainment.

It may be mentioned that the Directors of the South Suburban Gas Company give generous support to the various sports clubs in their area—at Sydenham, Bromley, St. Mary Cray, Dartford, Sevenoaks, Tonbridge, and other districts. These clubs are branches of the parent organization, the South Suburban Gas Amateur Sports Guild.

## South Metropolitan St. John Ambulance Dinner.

The St. John Ambulance Brigade Corps of the South Metropolitan Gas Company held their dinner and dance at Chiesman's Restaurant, High Street, Lewisham, on March 19. The chair was taken by the Corps Surgeon, Dr. W. D. Jenkins, J.P., and among those present was Mr. Harold Murphy, K.C., a Director of the Company.

The toast of "Co-Partnership" was proposed by Mr. E. V. Evans, O.B.E., General Manager, Mr. A. Lee, Employee Director, replying. Mr. H. Lesser put "The South Metropolitan Gas Company Corps," which was responded to by Corps Superintendent J. D. Payne. "The Guests" was honoured on the call of the Lady Ambulance Officer, Miss S. Midmore, and replied to by Capt. A. C. White Knox, M.C. The final toast, that of "The Chairman," was proposed by Corps Officer H. Ladbrook. The Chairman replied.

After dinner there was dancing to Stephen Townsend's Band, the M.C. being Ambulance Officer C. H. Grest.

## Farnworth and Kearsley Hot-Pot Supper.

The Benevolent Association of the Farnworth and Kearsley Gas Company held a hot-pot supper at the Rawson Arms Hotel, Farnworth, on March 7, when opportunity was taken to present gifts to six former colleagues who recently retired. The recipients were Messrs. F. B. Allen, J. Ennion, J. Nicholls, J. Wild, E. Foley, and J. Turton, and between them they had an aggregate of 246 years' service with the Farnworth and Kearsley Company.

## Oxford Sports and Social Club.

The separate sporting and recreational sections associated with the Oxford and District Gas Company have now been amalgamated into "The Oxford Gas Company Sports and Social Club" under the Presidency of the Managing Director, Mr. W. E. Caton. The necessary playing facilities have been afforded by the Company and already ambitious programmes have been launched for the furtherance of various sports.

# Gas Undertakings' Results

## British Gas Light Company.

The British Gas Light Company, an extended report of whose annual general meeting, which is being held to-day, will be published in a subsequent issue, report that for the year ended Dec. 31, 1937, the profit and loss account shows that, after providing for interest on debenture and debenture stocks, income-tax, and other charges, there remains £84,494 to be added to the sum of £80,878 brought forward from the last account, giving a total of £165,372. The General Reserve Fund (London) has been increased by £10,000 to £210,000, and dividends at the rate of 7% per annum, less income-tax, on the cumulative preference stock, 5½% per annum, less income-tax, on the "B" redeemable cumulative preference stock, and an interim dividend at the rate of 3½%, less income-tax, on the ordinary stock have been paid. The Directors now recommend that the payment of the above dividends be confirmed, and that a final dividend on the ordinary stock at the rate of 4%, less income-tax, making 7½% for the year, less income-tax, be paid on April 5. The final dividend will amount to £25,650, and the balance to be carried forward will be increased by £151 to £81,028. The Station Reserve Funds stand at £73,561, an increase of £2,918, and the Pension and Superannuation Funds have increased by £10,807 to £138,298 by the addition of interest and further sums set aside at the Stations. The total quantity of gas sold was less than in 1936 by a little over 1%. The Directors regret to have to record the death in November last of Mr. E. Knowles Corrie, who had been an Auditor of the Company since 1883.

## Cannock District.

The sales of gas during the past year by the Cannock District Gas Company, Ltd., amounted to 563,073 therms, and on Dec. 31 the consumers numbered 12,387, of whom 10,879 were prepayment. The dividend on the ordinary shares is 6% for the year, which leaves a carry forward of £2,519—a few pounds more than the amount brought in. The net addition to capital expenditure during the year has been about £7,000, bringing the Debit Balance

on Capital Account up to £39,903. In the balance-sheet gas stoves on hire (instalments not yet due) figure at £10,350, and on the other side the amount due to bankers is £41,118.

## Dalbeattie.

Dalbeattie Gas Light Company have made a profit for the year of £221 compared with a loss of £74 the previous year; a reduction in the prices of gas is probable.

## Dover.

The total quantity of gas sold by the Dover Gas Company during 1937 was 358,564,400 cu.ft., or 1,792,822 therms. As the result of the year's working, there is, after providing for all fixed charges, the interim dividend, and contributions to the Renewals and Co-Partnership Funds, a total available balance of £14,862, and the dividend of 8½% for the twelve months on the ordinary stock and shares will leave £9,044 to be carried forward to the credit of the current year. There is a balance of £7,228 at credit of Capital Account. At the foot of the Revenue Account appears a note explaining that the item debited for coals includes £1,960 paid to contractors for Town Coal Dues charged by the Corporation of Dover—namely, 1s. 7d. per ton, which is equivalent to 1·3d. per 1,000 cu.ft. of gas sold.

## Dublin.

The accounts of the Alliance and Dublin Consumers' Gas Company shows that the quantity of gas sold in the last six months of 1937 was 6,711,929 therms. There is no detailed comparison made in the report with the results of the working for the December half of 1936, nor are the corresponding figures included in the accounts, but the Directors say: "Owing to the enhanced cost of coal and labour, in combination with the effect of the prolonged strike in the building trades on sales of gas, the profit earned shows a decrease on this occasion." Including a balance brought forward of £51,829, there is a total at disposal of £95,729, of which a dividend at the rate of 8% per annum on the consolidated ordinary stock will absorb £70,697, leaving £25,031 to be carried to the next account. The net addition to capital expenditure during the half-year was about £20,000, making the debit balance on Capital Account £108,477.

## Hong Kong and China.

During the year 1937 the Hong Kong and China Gas Company, Ltd., sold 160,400,000 cu.ft. of gas at Hong Kong, and 83,500,000 cu.ft. at Kowloon. Out of the balance of net revenue the Directors recommend the payment of a dividend for the year at the rate of 5%. The meeting takes place at the Company's London Office on Monday, April 4.

## Horley District.

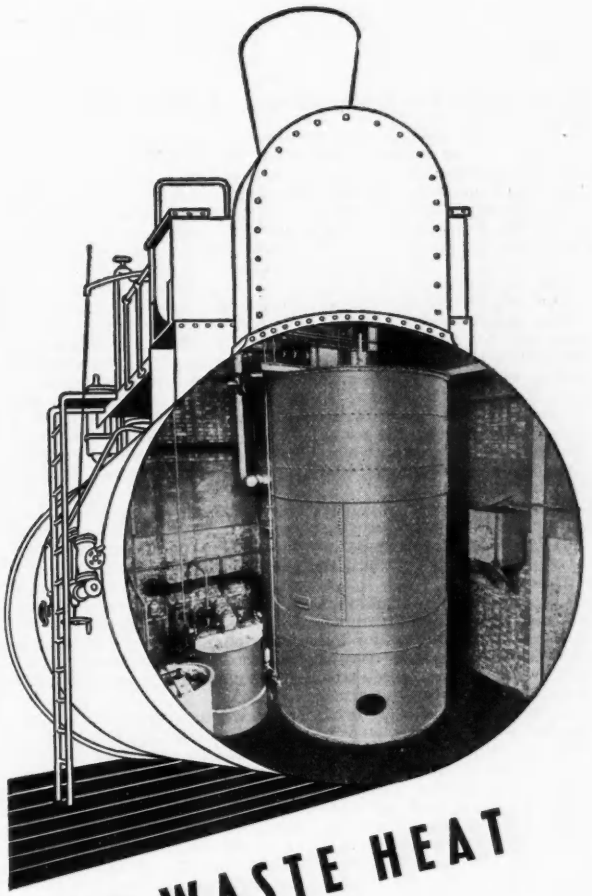
In the case of the Horley District Gas Company, an increase of 3% in sales of gas during 1937 followed increases in preceding years. The capital expenditure was increased by £2,776, after providing amply for depreciation. A new main has been laid to Salfords, and it is anticipated that this will lead to further business. The dividends for the year are at the rates of 10% on the "A" capital stock, and 7% on the additional "B" capital stock, which will leave a balance of £2,997 to be carried to next account —about £60 more than was brought in. The quantity of gas sold during the year was 112,683,700 cu.ft., or 535,248 therms.

## Keswick.

The Directors of the Keswick Gas Company are able to report the substantial increase of 4·6% in the output of gas during 1937, as compared with that of the previous year. The dividends are at the rates of 10% per annum upon the original capital and 7% upon the additional capital. The balance of revenue carried to Profit and Loss Account is £1,455, against £920 for 1936. In each case the figure is arrived at after allowing £500 for depreciation of cookers and meters. It has been decided by the Directors to extend hire-purchase facilities to operate over three, five, seven, or ten years.

## Londonderry.

Sales of gas by the Londonderry Gas Light Company during the year 1937 totalled 181,398,000 cu.ft., public lighting appearing as a separate item. Nothing falls to be added to the balance at debit of Capital Account, £10,469. A sum of £2,500 has been charged in the Revenue Account for the purpose of meeting future cost of renewals, and after the payment of dividends for the year of 10% on the old shares and 7% on the new shares there will remain to be carried forward to the next account £13,819, which is within a few pounds of the amount that was brought in.

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# TRADE NOTES

## Development in Instantaneous Water Heaters.

The aim of simplifying operation, increasing reliability, and lowering maintenance costs led to the inclusion of features on the new Radiation water heaters to render the performance more nearly automatic, to reduce further the human element in fixing and operation, and to ensure greater independence over local conditions such as variations in gas and water pressure. These new heaters were illustrated and briefly described in our issue for Feb. 23, p. 565; and we are now indebted to Radiation Ltd. for further technical details.

One step in this direction was the introduction of the gas governor as an integral part of the appliance. It is unnecessary to explain here the advantage of this feature, resulting as it does in the prevention of excessive overload with increase of gas pressure and its unpleasant results of sooting, damage to the fin structure, &c. Considerable saving in maintenance is realized in this manner. The inclusion of a governor as a regular feature of a water heater enables the overall size to be kept down. Radiation Ltd. consider these points of such importance that the new multipoint heaters 210M and 210ML are supplied with the governor included in the price.

A gas governor so incorporated enables the gas supply to be adjusted at the makers' works, provided the gas quality is known. This is of direct monetary advantage as it eliminates the time taken by the fitter to adjust the gas appliance on the consumer's premises.

The unavoidable fluctuations in water pressure from the main are another source of trouble, as they cause variations in temperature of the outflowing water. To eliminate this objection a water volume governor is incorporated in the Radiation multipoint water heater 210M, which is intended for operation upon main water services.

A temperature adjuster is also provided on this heater, which, together with the water governor, maintains constant the quantity of water delivered within wide limits of the opening of the hot water tap or taps attached to the heater. It ensures that the water temperature remains substantially constant no matter how many taps are opened and no matter what fluctuations in the water supply pressure may take place. Such a control reduces the time taken for the water delivered to reach the required temperature, as no adjustments are required at the tap. By so reducing the time the overall thermal efficiency of the appliance is increased. The incorporated temperature adjuster permits the pre-setting of the outflow temperature to any degree required and provides a very simple means of compensating for the variations in the temperature of the incoming water. Thus a slight turn of the temperature adjuster wheel will compensate for the differences between summer and winter inlet water temperatures. The combination of temperature adjuster and water governor, therefore, results, it is claimed, in increased convenience, reliability, and efficiency of the multipoint heater.

The method of regulating the water temperature by adjusting the hot tap is almost as inconvenient in a sink heater as in a multipoint, and for this reason the Radiation heater 80S incorporates a temperature adjuster, the lever of which, situated between the hot and cold taps, enables adjustment of outlet temperature to be made. Turned to the left-hand stop the hottest water will be obtained from the spout even when the hot tap is fully open, while moving the lever to the right will cool the water down to any required temperature. Such a temperature adjuster is, in fact, a variable restrictor in the water supply and enables the hot tap to be opened fully with confidence that under reasonably even water supply pressure conditions a constant outlet temperature will be maintained. Such a device also permits of compensation for summer and winter inlet temperatures.

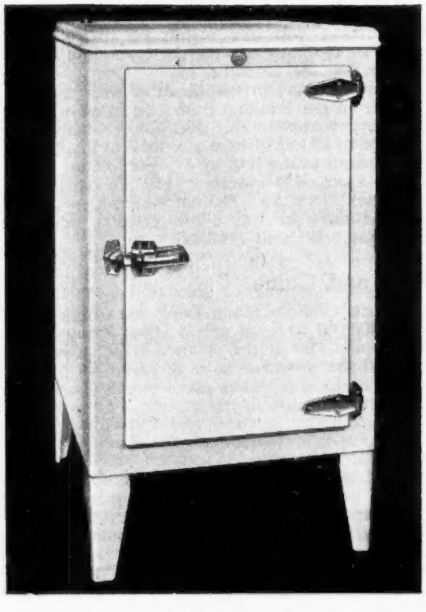
In many designs of automatic valves for instantaneous water heaters, water pressure not only influences the amount of water passing through but also affects the slow ignition of the burner, as this slow ignition control is provided by a check valve within the water-way. Higher water pressures, therefore, cause quicker ignition, and adjustment of the slow ignition device in accordance with the average water conditions is essential. In the Radiation multipoint heaters 210M and 210ML the slow ignition control is independent of the quantity of water passing through the appliance, as the check valve is operated by air and situated in the vent hole above the gas governor diaphragm. Such a check valve, by ensuring that the gas governor valve opens slowly, provides for smooth and noiseless ignition in all circumstances, and is unaffected by gas or water conditions.

Gas governor, water governor, temperature adjuster, and air operated slow ignition device bring the Radiation multipoint heaters near the ideal of a heater which requires no initial adjustment and the performance of which is uninfluenced by supply conditions. Such provisions not only save fitters' time but eliminate many causes for complaint.

## Ewarts Market a Gas Refrigerator.

A new gas-operated refrigerator has made its appearance in the Industry owing to the enterprise of the well-known firm of water heating engineers, Messrs. Ewart & Son, Ltd., of Euston Road, N.W. 1. The newcomer is known as the "Kula" and is being manufactured by a subsidiary company known as Kula Refrigerators, Ltd. The Directors are Messrs. J. W. Ewart, G. Ewart, J. H. Ewart, H. J. M. Boyer, and W. B. Hawes. A factory has been built on the North Circular Road at Willesden.

The refrigerator has been in production for some time now, and the company has opened new showrooms at 390, Euston Road, where all sales activities are at present being carried on. It is the wise policy of the Board to ensure steady production from their Willesden factory before launching any intensive sales drive; this step will preclude the possibility of demand exceeding production. The "Kula" is the result of research patiently carried out over a number of years, and even when the appliance was evolved in its present form it was the subject of practical tests in a number of typical kitchens. At the end of a year's test the models were dismantled and thoroughly inspected. The results were entirely satisfactory. Having thus ensured the high standard of operating efficiency at which the Directors had aimed, production was started.



The "Kula" Refrigerator.

At present only one model is being marketed. This has a capacity of 3 cu.ft. and is listed at 29 guineas. The exterior is finished in durable white enamel with chromium-plated hinges, lock, and regulator. There are four ice trays and shelves. With the regulator set at maximum the gas rate is 3 cu.ft. per hour, cutting down to ½ cu.ft. per hour on thermostatic control. The principle of operation is, of course, constant absorption. The unit is robustly constructed and covered by the firm's patents.

As is to be expected the "Kula" possesses all the advantages of gas-operated refrigeration, among which we might mention absolute silence in operation, no moving parts to wear out, economy, and elimination of radio interference.

## Clough (Croydon), Ltd.: Boiler Flue Airseal.

Combustion engineers, runs a leaflet published by Clough (Croydon), Ltd., Progress Way, Purley Way, Croydon, place fuel waste due to cracked and leaky flues from 5 to 15%, and while this loss is invisible, the visible loss is found in the coal content. The cost of "Airseal"—a plastic compound prepared for ready application with a trowel to make flues airtight—is small in comparison with the economy it effects. Recent tests have shown that an application of "Airseal" raised the percentage of $CO_2$ in the flue gases from 2½ to 16½%.

## Sidney Flavel & Co., Ltd.: Representation.

Mr. A. C. Hall has been appointed as a representative of Messrs. Sidney Flavel & Co., Ltd., Eagle Foundry, Leamington, and is taking up his new duties at once.

## C.O.L. Chambers at Brentford.

A lavishly illustrated brochure has been published by Gas Chambers and Coke Ovens, Ltd., Artillery House, Westminster, S.W. 1, dealing with the C.O.L. Chambers at the Brentford Station of the Gas Light and Coke Company. This is the largest plant of its type in the country. Only Durham gas coals are carbonized at Brentford—there being some twenty odd varieties—and during a 40-day test on the No. 1 unit 80·3 therms of 510·2 B.Th.U. gas was produced. In the case of the No. 2 unit the test was waived since for months on end it produced an average of 82 therms of 510 B.Th.U. gas. The installation consists of 96 chambers, each having a capacity of 4·14 tons Durham gas coals.

## Main's New Cooker Catalogue.

The new gas cooker catalogue for the 1938 season, just issued by R. & A. Main, Ltd., provides a further example of the high quality of publicity literature which has come to be expected from this firm. In addition to that, however, this latest publication shows that the design and quality which is associated with all Main products have been fully maintained, while recent research has led to the introduction of a number of improved features which enhance the value of well-tried appliances.

We note early in the catalogue details and illustrations of the "Simplite" automatic flint lighter, for the simple attachment of which all gas rails on Main cookers are drilled, tapped, and plugged. Withdrawal of the lighter from its holster automatically produces the flame, and the gas is cut off again when the lighter is replaced and allowed to fall to its normal vertical position. A spare flint is stored in the holster. A section is devoted to the uses of the "Mainstat" automatic oven control, while further notes are given of the enamel finishes available and the patent plate racks.

Subsequent pages contain illustrations and full specifications of the firm's well-known lines, including the "Sussex" and other high-grade models, followed by examples of standard cookers, rings, and hotplates. A section deals with the "P.R." hotcloset which may be fitted either on the cooker in place of the usual plate-rack or independently on the wall. Then we have a number of larger cooking appliances suitable for hotel and restaurants, hospitals, schools, and institutions, and finally some miscellaneous apparatus, including an interesting iron heater for use in domestic science classes, schools, laundries, &c., where a number of independent irons are required.

## A New Thermostatic Radiator Valve.

For the automatic control of steam and hot water radiators, the British Thermostat Company, Ltd., Teddington Works, Sunbury-on-Thames, Middlesex, have introduced the Type BZ thermostatic radiator valve, which, at very modest cost, gives individual control of the temperature in each room. It comprises the use of thermostatic valves which are, in effect, flow regulators the operation of which is governed directly by the room temperature without the intervention of electrical apparatus. In principle, such a regulator consists of a water or steam valve, the opening and closing of which is effected by the contraction and expansion of a flexible metallic bellows which is connected by fine-bore tubing to a bulb or phial charged with a volatile liquid and installed in a position representing the mean room temperature. Increase of temperature at the bulb causes the vapour pressure in the charged system to increase, resulting in progressive expansion of the thermostatic bellows and closing of the valve, while a decrease of room temperature reduces the vapour pressure, the bellows contracts, and the valve opens.

The BZ thermostatic radiator valve can be set to maintain any desired temperature between the limits of 55° F. and 85° F. by turning the small adjusting screw inset in the handwheel, while the handwheel itself is used for shutting off the radiator entirely when desired. An important feature of this valve is that operation of the handwheel to give a definite shut-off does not vary the temperature setting, so that when next the radiator is put into service the temperature adjustment is automatically correct.

Another valuable feature, which will appeal particularly to the practical fitter is that in the event of damage to the bulb, capillary tube, or bellows, the complete thermostatic element can be removed and replaced by simply unscrewing the bottom cap, without breaking any joints or losing any steam or water. The BZ thermostatic radiator valve is available in one size only, with ¾ in. gas connexions as standard, but certain other screwings can be supplied to order.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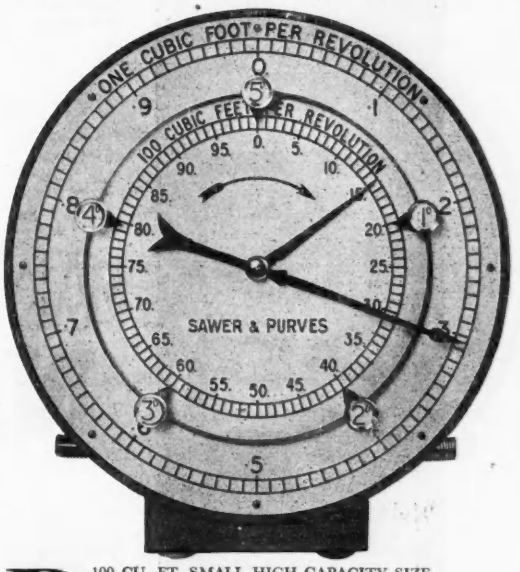


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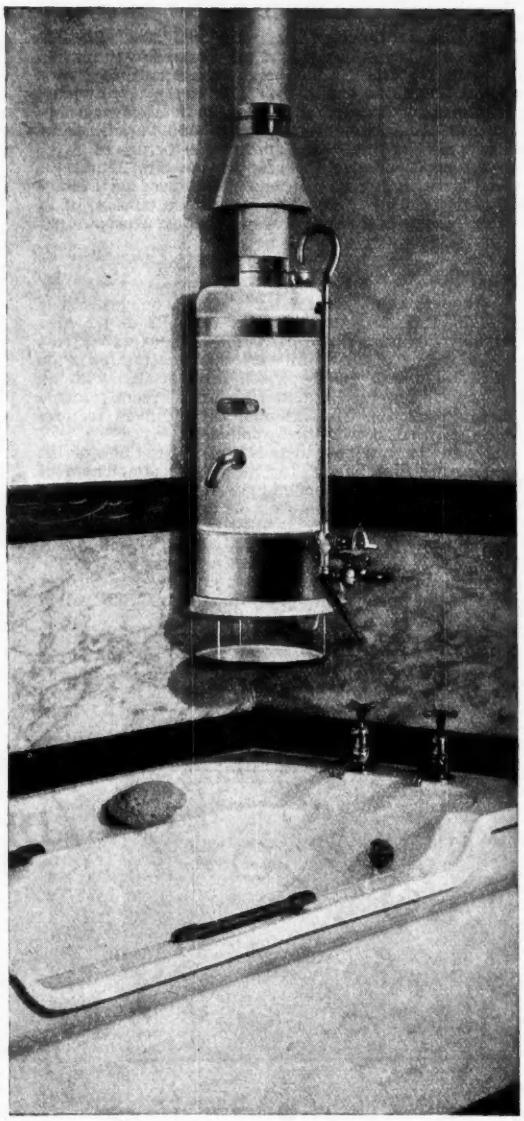

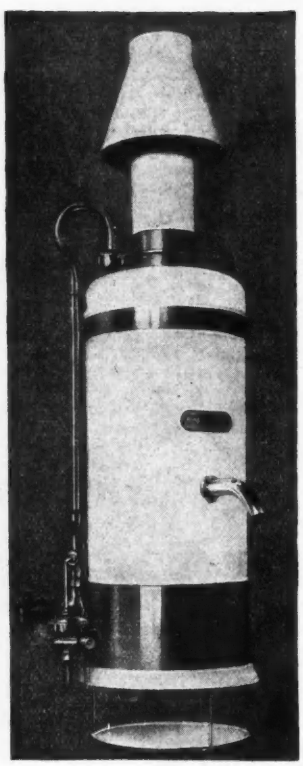

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# Radiation Limited

## Mr. H. James Yates' Speech at the Ordinary General Meeting

At the Annual Meeting of the Company held at The Incorporated Accountants' Hall, Victoria Embankment, London, on the 23rd March, 1938, the Chairman, Mr. H. James Yates, said:—

Before proceeding with the business of this Meeting, I must refer to the loss we have sustained by the death of our esteemed colleague, Mr. Harold N. Davis. He was in the Foundry and Gas Stove trade throughout his business career, and his long and practical experience was of great value to Radiation. He was beloved by all the workpeople and by his colleagues. We miss him very greatly.

You will have noticed from the Report and Balance Sheet that we have elected Mr. J. F. Davies as Deputy Chairman. He has been associated with me in the Gas Stove trade for over forty years. His knowledge and experience of all sections of the business is invaluable to the Company. I personally very heartily welcome him as the Deputy Chairman, and I know all my colleagues do also.

I now propose dealing with the Report and Accounts of the Directors for the year to the 31st December, 1937, and I presume you will, as usual, wish to take these as read.

I would like, however, to refer somewhat briefly to the more important items in the Accounts. Firstly the Profit and Loss Account and the Balance Sheet as set out on pages 4 and 5.

The net income from the Subsidiary Companies for the year amounts to £326,958, compared with £328,109 for 1936. Adding the balance of profits brought forward from 1936, £127,483, and the Transfer Fees and Bank Interest, the total to the credit of the Profit and Loss Account is £455,165. Deducting therefrom the Interim Dividends paid in October last, and the transfer of £20,000 to General Reserve, there remains the sum of £357,667 available which is carried to the Balance Sheet. Of that amount £225,978 is reserved for the proposed Final Dividends and Bonus, leaving £131,689 to be carried forward to next year. This compares with a carry-forward figure of £127,483 a year ago.

The only other item on the Liabilities side of the Balance Sheet to which I would like to refer is the General Reserve. After taking into account the transfer this year of £20,000 the Reserve stands at £220,000.

On the Assets side of the Balance Sheet, the principal items are the Investments in the Subsidiary Companies at cost and the balances owing to Radiation by those Companies. The latter item, amounting to £1,455,701, includes the Dividends declared by the Subsidiary Companies for the year 1937, the balance of Dividends for past years and Charges by Radiation for amounts it has paid on behalf of those Companies.

I do not think that any other item in the Radiation Balance Sheet requires comment.

Dealing now with the Combined Statement of the Subsidiary Companies set out on pages 6 and 7, you will notice that, on the Assets side, Land and Buildings now amount to £841,099, and Plant and Machinery to £409,905, a total of £1,251,004 for fixed Assets. That figure, which is an increase of some £99,000 compared with a year ago, is arrived at after making provision for Depreciation and Obsolescence. The increase is accounted for by the necessary expenditure incurred on further buildings and additional plant to enable us to cope with the production of our new types of gas cookers and other classes of goods we manufacture.

The next item—Stocks—shows an increase. This is due both to increased prices of raw materials and, in view of the general demand, to our taking steps to ensure that ample supplies would be available for our requirements.

The remaining Asset items—Debtors, Investments and Cash—show reductions compared with a year ago. Against these reductions, however, we have the increased Stocks and the additions to fixed Assets during the year.

On the Liabilities side of the Statement you will notice that no amount is shown this year for Debentures of a Subsidiary Company. During the year the Debentures were redeemed so that all Assets of the Subsidiary Companies are now entirely free from any prior charge.

Sundry Creditors, Taxation Reserves, etc., show an increase of £37,775.

The next two items represent the cost to Radiation of the whole of the Share Capital in the Subsidiary Companies, and amounts due from those Companies to Radiation. These items are complementary to the first two amounts on the Assets side of the Radiation Balance Sheet, and I have already mentioned them when dealing with that Account.

Finally there is the amount of the balance remaining to the credit of Profit and Loss Accounts of the Subsidiary Companies—£533,489, compared with £450,871 a year ago.

For some years past I have referred, when addressing you, to the rising cost of manufacture of various types of apparatus, due to the successive improvements and developments arising out of our intensive Research work (a subject to which I shall refer a little later); and I have also from time to time referred to severe competition, to which I made special allusion in my Address to you last year. As I forecast on that occasion, the costs of raw materials have again risen considerably during the past year; wages of workpeople have advanced, and they now have holidays with pay, with which I am in full sympathy. These items, together with the Pension Scheme for our staffs, heavy taxation and, in addition, the National Defence Contribution, amount in total to a very substantial sum.

In December, 1936, we were compelled to make a small advance in our prices, except of course where we had contracts, but this by no means covered our increased costs, and in April last year we made a further small increase. These two small advances have not compensated for our heavier costs, and so our profits for the past year are not equal to those of the previous year.

I am sure most of you know of our "New World" Gas Cookers and High Beam Gas Fires, and probably many of you have these appliances in your homes. There are millions of users of these goods all over the world. I am greatly pleased to be able to tell you that, while retaining the fundamental principles which have made our "New World" Cookers outstandingly better than all other gas cookers, we have this year, as a result of our prolonged Research work, introduced further developments which place them in a still more unapproachable position. We have been able to cover these developments by a number of Patents, so we are looking forward to more than holding our own against all competitors, as we have always done in the past.

We have further developed our principle of single oven-burner and direct bottom-flue-outlet, and have attained a still higher efficiency and even better cooking. This new construction is also protected by Patents. There are other important improvements and, without going into full details, I may tell you that, as regards the hotplates, all one has to do now is simply to turn-on the gas taps and the burners will light-up.

The oven burner can be ignited by applying a light to a lighting-hole just inside the door.

With the copies of my Address there will be enclosed a booklet giving further details of the latest developments which we have made in our "New World" Cookers.

Our thermostat, for which, a number of years ago, we registered the name "Regulo" as a Trade Mark, still has no equal. Many have copied it, as far as they can, in construction and appearance, but they have a long way to go to approach the quality and reliability of our "Regulo." The word "Regulo" has become so well known that many people are under the impression when they see a thermostat on a cooker of some other make, that it must be a "Regulo." It is necessary for me again to emphasise that the "Regulo" is a Radiation product and is only obtainable with Radiation apparatus. Every "Regulo" supplied with our Cookers is fitted with a vizor or shield with a triangular-shaped aperture in which the setting number appears. This triangular opening is protected by Registration, so always look for a number in the triangle, and for the word "Regulo," to make sure you are getting a Radiation Cooker with the "Regulo."

The Radiation Cookery-Book has become more than ever a standard book—not only in this country but in other parts of the world. A new Edition will shortly be issued. The sales of the book for the past year were considerably in excess of those during the previous year.

Last year I dealt with the subject of Dietetics. More than ever I regard this as very important and, if you will forgive me, I will repeat what I said then:—

> "The subject of Dietetics is not sufficiently studied. Both "good food and good cooking are essential to maintain us in "good health. Nutritious food does not always mean costly "food; some of the simplest things can be served in such a "way as to be most appetising and frequently an enjoyable "meal can be made from very little material. Good cooking "has not always been a strong point in this country, but "things have changed very much in recent years, and I think "Radiation can take credit for having done a great deal to "this end."

We are continuing our close study of Dietetics in our Research Kitchens. There are still many intricate problems to be investi-

# IT'S THE NEEDLES THAT COUNT

It's the needles that make the difference so noticeable in the Newton Needle Steam Heated Gas Heater. This use of needles on the element is a planned and patented principle. No other system can ensure a better heat transfer or a more negligible back pressure.

But these are not the only advantages. The elements are of a special cast iron so that you have no corrosion problems. Less tubes are necessary and less space is occupied. In actual fact the saving of space over other types is anything up to 40%.

The Newton Needle Gas Heater is built to last, so that considering how low is its initial cost, it is indeed an economical installation.

NEWTON NEEDLE
STEAM HEATED GAS HEATERS
NEWTON CHAMBERS & CO LTD THORNCLIFFE NR SHEFFIELD

gated, and I am hopeful that in due course further valuable results will be attained.

We are training in these Kitchens a number of experts (who take up positions all over the country), and their lectures and demonstrations have been greatly appreciated by a very large number of housewives.

In these times the only way to manufacture economically is to standardise and to produce in large quantities. Those who are familiar with manufacturing processes will appreciate the addition to the cost which results if there be even a slight deviation from the standard article. Requests are made to us for some slight alteration, and I do not think it can be realised what this entails. To give one instance: we are sometimes asked to make an alteration in the standard lettering on the enamelled doorplate of a cooker. Each variation would necessitate the making of a special stencil. Then the plates, as they pass out of the furnaces, would have to be watched and sorted out, and when the cookers are assembled on our large conveyors (some of which are 620 feet in length), special arrangements would be needed so that when the cookers on their journey on the conveyor reach the stage where the doorplates are fitted, all the varieties of doorplate must be placed ready at this point, and extra hands employed to ensure that at the exact moment the right plate is available. Imagine what this can mean at this particular point of assembly when, to comply with such special requests, there might be hundreds of doorplates differing only in respect of the lettering.

As an example, I have cited only the doorplate, but similar complications would arise in the case of all departures from standard, because they occur at different points on the conveyor as the cookers are passing along during assembly, and this would slow down output in the Works and greatly increase the cost of manufacture. In addition, when the completed cookers pass from the conveyor, instead of taking their routine course for immediate despatch, or putting into stock, they must be sorted by additional workpeople, and those varying from standard separately stored. This would add greatly to the storage problem and extra space would be required. The continuous method of assembly is intended to simplify and cheapen production, but any departure from standard results in an increase in cost altogether disproportionate to the extra cost of the alteration itself.

All our new cookers are definitely standardised and no alterations can be made, because if the definite standard were altered, then, with the consequent increase in the cost of production of the cookers, the selling prices would rise accordingly. It is only by standardisation that prices can be kept at the lowest possible figure.

In regard to our High Beam Gas Fires, as the result of our continued Research we have in hand some very remarkable developments, which I believe will add more than ever to the comfort of using gas fires, and will result in their still wider application.

We are the pioneers of the modern gas fire and gas cooker, and the Technical Press has always recognised this by referring to our work from time to time, and last year very special reference was made to our pioneer work. But like all pioneers, we have unfortunately had much of that flattery which, proverbially, consists in imitation—competitors following our principles of construction so far as they are able to do without infringing our Patents. We have, however, a large number of Patents that protect the results of our Research work and investigations, and we have recently taken out additional Patents.

Large Cooking Apparatus for hotels, restaurants, large public institutions, etc., has always formed an important part of our business, and recently we have introduced fresh developments in this particular class of equipment. As a result—I can say this with full knowledge—there is no gas apparatus of this type that can compare with ours. Indeed, the developments in our Large Cooking Apparatus are such that they place it in a class by itself, and the latest of these have been so much appreciated that quite a number of important chefs from the Continent have visited England and inspected our most recent productions. We have established a world-wide reputation for this class of goods.

I am sure you will be interested to know that we have been successful in obtaining the large order for the gas cooking apparatus for the equipment of the kitchens of the Birmingham Hospitals Centre. The total extent of the site is 150 acres—the kitchens alone have an approximate floor area of 4,150 square feet. This new Centre will be opened by His Majesty The King on July 14th next.

I think what I have said will give you some idea of the continuous Research and development work we have in hand in respect of the various types of apparatus which we manufacture.

Our new Laboratories in Birmingham, to which I referred last year, have been visited by many people, not only from this country but from other parts of the world, and the consensus of opinion is that, as regards equipment, for our particular class of Research work, our Laboratories have no equal.

During the past year we have continued our systematic advertising in the Daily Press and in numerous magazines and periodicals. There is one method of publicity to which I should like to make special reference. I can say without hesitation that we were the first to have films made to popularise domestic gas apparatus and to bring before the notice of the public the labour-saving and many other valuable features of these appliances. I am very glad to see that this form of propaganda is increasing, and its popularity is proved by the large audiences who see the films.

In past years I have told you that it has been my earnest endeavour to make the shares in your business a Gilt-Edged Industrial Investment, and so far I think we have succeeded. The year 1936 was an exceptional one, both as to the volume of trade and the amount of our profits but, as you know, conditions have been changing. We are, however, in a position to meet changes and, of course, we are continually developing and improving the goods we manufacture. You can rest assured that no effort on our part is being spared to continue the success of your business.

It is reassuring that the Chairmen of our big Banks have recently expressed such definite opinions as to the prosperity of British Trade. Their views are founded on a thorough survey of present conditions, and prospects in the future. It is obvious that there are fluctuations in most commercial undertakings in regard to the profits earned year by year. We all know that if we keep telling a man he looks ill, almost invariably he begins to feel ill without any cause whatever. This also applies to trade. To declare that trade is not what it ought to be, and that it is going to be worse, has an effect on the minds of many people, and pessimism prevails instead of optimism. At the present time, in certain directions there are difficulties, and the world-horizon is far from clear, but I see no reason for pessimism. Optimism and a well-balanced mind will carry us over most obstacles and bring prosperity in many ways.

There is one matter, however, in regard to which I think a word of caution is needed. Taxation is now very heavy. Local Rates are increasing and I do feel that no Municipal expenditure should be embarked upon without careful investigation, as such expenditure is not justified if rates will in consequence be unduly raised, causing the community to suffer in other directions. It is obvious that if the prosperity of the country is to continue there must be available each year individual savings for reinvestment. The increasing burden of National and Local taxation is seriously depleting the amount so available.

The loyalty of all those in the service of the Company has greatly helped towards the continued success of your business, and I am sure I shall be expressing your wishes if I convey to them your appreciation and thanks.

I have pleasure in moving:—

"That the Directors' Report and Accounts for the year "ended 31st December, 1937, as presented by the Directors, "be received and adopted, and that Final Dividends and "Bonus be declared as follows:—3 per cent., less Income "Tax, for the half-year to 31st December, 1937, on the 6 per "cent. Cumulative Preference Stock; 9⅜ per cent., less Income "Tax, on the Ordinary Stock, making, with the Interim Divi-"dend, a total Dividend of 12½ per cent. on the Ordinary "Stock for the year; and a Bonus on the Ordinary Stock of "2½ per cent., less Income Tax."

## Reinforced Concrete on Gas-Works

Among many splendid examples of reinforced concrete construction carried out by J. L. Kier & Co., Ltd., in all parts of the United Kingdom are a number of buildings for gas undertakings. An interesting brochure recently published by the firm to mark their tenth anniversary covers a selection of some of the more noteworthy of these contracts, and included in a range of work from river bridges to silos and from factory buildings to the penguin pool at the London Zoo we note an illustration of the coke screening and grading plant at the Lea Bridge and Cambridge Gas-Works and coal store and breaker pit, coke bunker, and screening chamber at the Mossley Gas-Works.

The provision of supports at one end of the Cambridge bunker was precluded by the presence of a gas main. The support was therefore reduced to two lines, the bunkers cantilevering at each end in order to make the structure statically determinate. If extra lines of support had been used any unequal settlement, which would, of course, have been of small magnitude, would nevertheless have produced considerable re-distribution of stresses, since the total depth of the walls and sloping bottoms was utilized as a beam to distribute the weight on the supports. In order to avoid the risk of damaging the gas main by vibration due to pre-cast pile driving, bored piles with clubbed feet were employed.

Hear what good cooks are saying—
ABOUT THE NEW
'500'
SERIES
COOKERS
"THE LADIES WILL LOVE THESE GAY COLOURS IN THEIR KITCHENS."
"AUTOMATIC OVEN HEAT CONTROL—SO SIMPLE—SO SURE."
"AND THE SPECIAL VULCAN FEATURE—A GLASS OVEN DOOR."

Personal recommendation by one satisfied user to another has sent the sales of Vulcan Stoves soaring. In the "500" Series Cookers every labour-saving device and every modern improvement have been incorporated; the result is a Gas Cooker up to the minute in perfection and convenience.

- Oven door of double Armourplate Glass, with air space between panes. (Or with enamelled panel door.)
- Automatic Oven Heat Regulator.
- Single back oven burner; bottom flue outlet.
- Patent self-locking grid shelves.
- Housewife planned hot-plates, with covered griller.
- Vitreous enamel finish throughout. In mottled grey or plain colours. Chromium plated fittings.

# VULCAN STOVES

THE VULCAN STOVE COMPANY LIMITED, EXETER

# Markets and Manufactures

## Current Sales of Gas Products

### The London Market

*March* 28.

There are no changes to report in the prices of Tar Products, which are as follows:

Pitch, nominal, at 36s. per ton f.o.b.
Creosote, about 5¼d.
Refined tar, 3¼d.
Pure toluole, 2s. 1d. to 2s. 2d.
Pure benzole, 1s. 8d.
95/160 solvent naphtha, 1s. 7d.
90/160 pyridine, 10s. to 11s.
All per gallon naked at makers' works.

### The Provinces

*March* 28.

Crude Gas-Works Tar, 20s. 3d. to 25s. 3d.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 33s. 6d. to 34s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 33s. 6d. to 34s. 6d.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4⅞d. to 5⅛d.; low gravity, 4½d. to 4⅝d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. to 3s. 3d. Naphthalene, £13 10s. to £16. Salts, 80s. to 85s., bags included. Anthracene, "A" quality, 4½d. to 4⅝d. per minimum 40% purely nominal; "B" quality unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

### Scotland

GLASGOW, *March* 26.

There is still very little movement in this market and prices remain easy.

Crude gas-works tar.—Actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch is lower at 26s. to 27s. per ton f.o.b. for export and about 25s. to 27s. per ton *ex* works in bulk for home trade.

Refined tar remains at 3¼d. to 4d. per gallon for home trade, while export market is easy at 3d. to 3¼d. per gallon, both *ex* makers' works in buyers packages.

Creosote oil is moving in reasonable quantities at the following prices: Specification oil, 5d. to 5¼d.; low-gravity, 6¼d. to 6½d.; neutral oil, 5d. to 5¼d. per gallon, all *ex* works in bulk.

Cresylic acid.—Comparatively little business is being concluded and values are lower as under: Pale, 97/99%, 2s. 5d. to 2s. 7d. per gallon; dark, 97/99%, 2s. 3d. to 2s. 5d. per gallon; and pale, 99/100%, 2s. 8d. to 3s. per gallon, according to quality, all *ex* works in buyers' packages.

Crude naphtha.—Supplies are small and readily command 6d. to 6½d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 6d. per gallon, and 90/190 heavy naphtha is 1s. 1d. to 1s. 2d. per gallon.

Motor benzole is well looked after at 1s. 4½d. per gallon.

Pyridine.—90/160 grade is 12s. to 12s. 6d. per gallon and 90/140 grade is 13s. to 14s. per gallon.

### Benzole Prices

These are considered to be the market prices for benzole at the present time:

| | s. | d. | s. | d. | |
|---|---|---|---|---|---|
| Crude benzole.. | 0 | 9 to | 0 | 9½ | per gall. at works |
| Motor „ .. | 1 | 2½ „ | 1 | 3 | „ „ „ |
| 90% „ .. | 1 | 3½ „ | 1 | 4 | „ „ „ |
| Pure „ .. | 1 | 7½ „ | 1 | 8 | „ „ „ |

## Contracts Advertised To-Day

**Cast Iron Pipes.**
Blackburn Gas Department. [p. 986.]

**Crude Benzole (Purchase).**
Wallasey Gas Department. [p. 986.]

**Paint.**
Bexhill Gas Department. [p. 986.]

**Painting.**
Bexhill Gas Department. [p. 986.]

## Dividend Announcements

**British Gas Light.**—Ordinary maintained at 7½% by final of 4%.

**Primitiva Gas Company of Buenos Aires.**—Dividend of 2½%, free of tax (2%), payable April 29, to shareholders on registers April 5.

**Lancashire Dynamo and Crypto.**—On the cumulative preference shares, 5½% per annum, including interim dividend paid to June 30, 1937; and on the ordinary shares, 25% for the year, including 7½% interim dividend paid to Sept. 30, 1937. The carry-forward is £66,561.

## Applications for Patents

WILSON GAS METERS, LTD., G., REYNOLDS, T., AND WIGGINS, T.—Means for controlling gas supply. No. 3501.

WILSON GAS METERS, LTD., G., WILSON, J. H., AND POOLE, D. C. E.—Prepayment gas meters. No. 4152; dry gas meters. No. 4153.

### Complete Specifications Accepted.

NORMAN, F. A., AND NEW GEYSERS (1931), LTD.—Water heaters. No. 479,109.

CANNON IRON FOUNDRIES, LTD., CLAYTON, R. T., AND HOLDEN, C. J.—Control of gas cookers. No. 479,143.

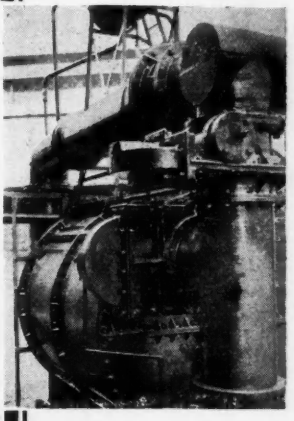
RADIATION, LTD., YATES, H. J., AND WASS, N. H.—Gas-heated radiators. No. 479,145.

PARKINSON STOVE COMPANY, LTD., AND TAYLOR, H. G.—Burners for gas fires. No. 479,153.

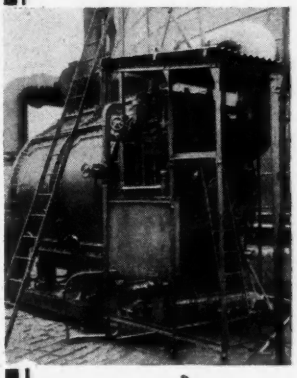
WILSON GAS METERS, LTD., G., WILSON, J. H., AND MILLNER, F.—By-pass fitting for use with gas meters. No. 479,230.

PARKINSON STOVE COMPANY, LTD., AND COLLEY, A. G.—Gas cookers. No. 479,521.


**When a Joint leaks—**



*Permac Joints in a Gas Works.*



*Permac Joints in a Gas Works.*

**Consider the loss in output while the plant is shut down and the joint is being re-made.**

**"Permac" the original Metal-to-Metal Jointing makes leak-proof joints that last till you want to break them down. Stands up to all temperatures and pressures. Equally successful on steam, gas, water, oil joints.**

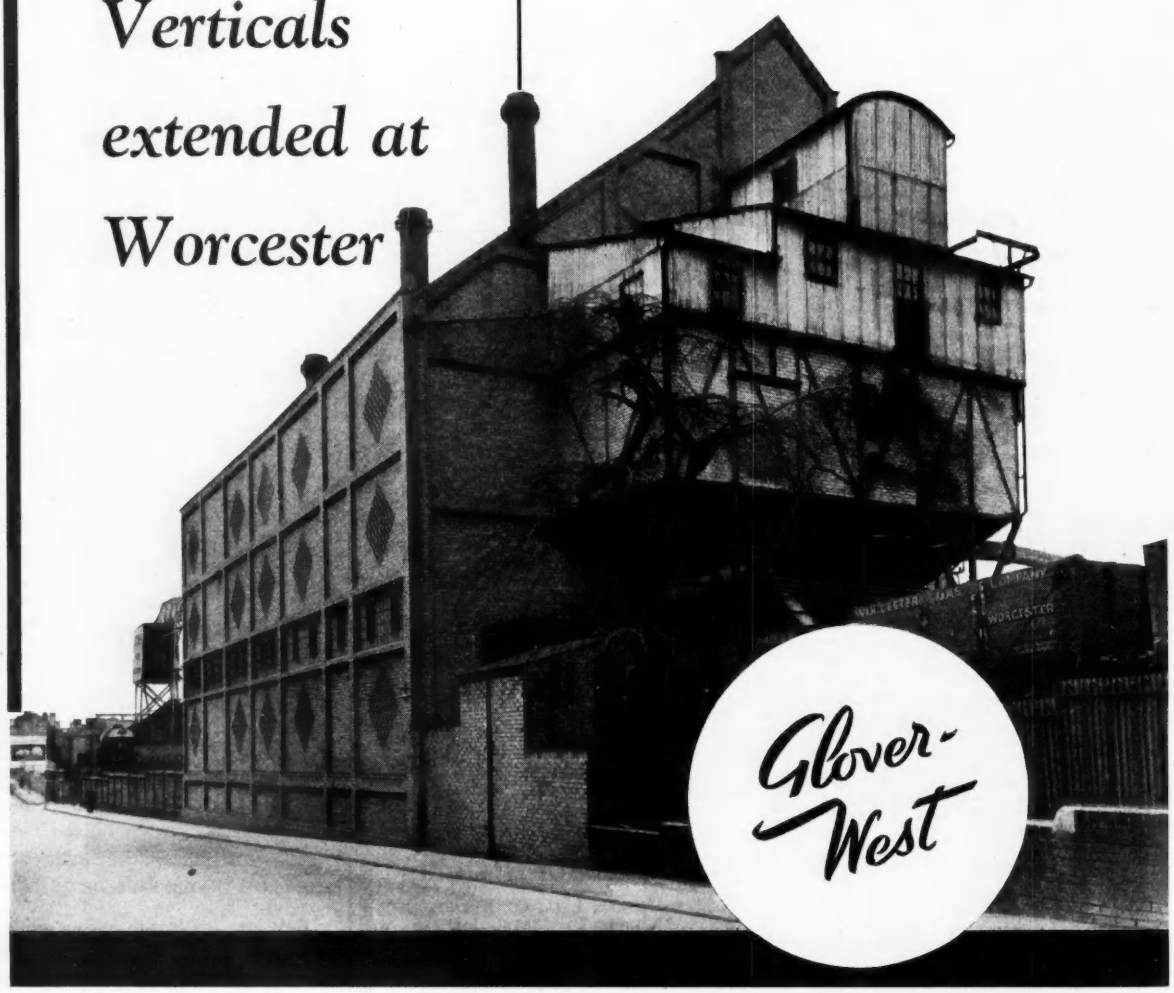
*Send for particulars.*

Permac
METAL-TO-METAL JOINTING MATERIAL

*Sole manufacturers:—*

**THOMAS & BISHOP LTD.**
**37, Tabernacle St.**
**LONDON, E.C. 2**
*Telephone: Clerkenwell 3351 (2 lines)*

# *Glover-West Verticals extended at Worcester*




The illustration shows the Glover-West vertical retort house at the works of the Worcester New Gaslight Company with the extension recently added. The original plant of 12 retorts was put to work in 1934. Its capacity is considerably more than doubled by the new bench of 16 retorts with waste-heat recovery equipment and pressure producers.

**CONTINUOUS VERTICAL RETORTS**

*418 plants built or ordered in 24 countries*

**WEST'S GAS IMPROVEMENT CO. LTD.,**

**MANCHESTER: Albion Ironworks, Miles Platting ■ LONDON: Columbia House, Aldwych, W.C.2**

# GAS STOCKS AND SHARES

Although nervousness over the European situation somewhat abated and led to a short burst of activity at the beginning of last week, several other adverse factors came into being and the volume of business soon settled down again to small dimensions. Fears of some increase in direct taxation, the further weakness in Wall Street, and the forthcoming three-week account all tended to restrict operations. It now seems that several weeks of inactivity are ahead unless foreign politics take a swift turn for the better.

It is satisfactory to note, however, that prices generally, though not closing at the best, showed improvements on a week ago. British Funds were mostly about 1¼ higher, and several substantial rises occurred in home rails. Some of the "heavies" among the industrials also more than recovered their previous losses. Mining shares were erratic, while oils and rubbers on the whole closed lower.

Business in the Gas market was much the same as elsewhere, and prices showed very few signs of recovering. They did not suffer, however, to the same extent as in the previous week, though Gas Light units again closed slightly lower at 21s. 9d.-22s. 9d., and at the price available yielded nearly 5%. The only fall of any note was a sharp drop of 8½ points in Hornsey to 110, at which price a parcel of £1,000 is on offer to give a return, on a 6% dividend basis, of £5 9s.%. On the Provisional Exchanges, Bath consolidated was marked up 2 points to 121, while Newcastle units fell 3d. more to 22s. Apart from *ex div.* markings, the nominal quotations in the Supplementary List remained unchanged.

The accounts of the British Gas Light Company for the year 1937 show a net profit of £84,494, against £82,695 for 1936. The general reserve fund (London) receives £10,000 (against £15,000), making £210,000, and the station reserve funds now stand at £73,561, an increase of £2,918. The Directors are recommending a final dividend on the ordinary stock of 4%, making 7½% for the year, the rate paid for many years past. The balance forward will be £151 more at £81,028. A parcel of ordinary stock is available at 142 *ex div.*, to yield £5 5s. 7d.%.

The Directors of the Hong Kong and China Gas Company propose to pay a dividend of 5% for the year 1937. No interim dividend has been paid, and the current rate compares with 6% for 1936.

## Official Quotations on the London Stock Exchange

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 1,767,439 | Mar. 7 | 8 | 8 | Alliance & Dublin Ord. ... | 153–160 | ... |
| 374,000 | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb. ... | 95–100 | ... |
| 558,190 | Nov. 15 | 5 | 5 | Asscd. Gas & Water U'd'ts Ord. | 18/6–20/6 | ... |
| 500,000 | ,, | 4½ | 4½ | Do. 4½ p.c. Red. Cum. Pref. | 19/–21/- | ... |
| 216,041 | ,, | — | §-/4 | Do. 4 p.c. Red. Cum. Pref. | 19/–20/- | ... |
| 278,590 | ,, | §-/2⅞ | 4 | Do. 4 p.c. Irred. Cum. Pref. | 17/–19/– | ... |
| 500,000 | Mar. 7 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 94–99 | ... |
| 558,890 | Feb. 21 | 7 | 7 | Barnet Ord. 7 p.c. ... ... | 158–163 | ... |
| 300,000 | Oct. 4 | 1/9⅜ | 1/4⁵ | Bombay, Ltd. ... ... ... | 26/–28/– | ... |
| 179,915 | Feb. 21 | 9½ | 9½ | Bournemouth sliding scale ... | 197–202 | ... |
| 590,407 | ,, | 7 | 7 | Do. 7 p.c. max. ... | 156–161 | ... |
| 493,960 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... | 132–137 | ... |
| 50,000 | Dec. 13 | 3 | 3 | Do. 3 p.c. Deb. ... | 78–83 | ... |
| 262,025 | ,, | 4 | 4 | Do. 4 p.c. Deb. ... | 98–103 | ... |
| 335,000 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 115–120 | ... |
| 357,900 | Feb. 21 | 7½ | 7½ | Brighton, &c., 6 p.c. Con. ... | 145–150 | –2 |
| 649,955 | ,, | 6⅜ | 6⅜ | Do. 5 p.c. Con. ... | 128–133 | ... |
| 205,500 | ,, | 6 | 6 | Do. 6 p.c. 'B' Pref. | 125–130 | ... |
| 855,000 | Mar. 7 | 7 | 8 | British Ord. ... ... ... | 138–143 | ... |
| 100,000 | Dec. 13 | 7 | 7 | Do. 7 p.c. Pref. ... ... | 142–147 | ... |
| 350,000 | ,, | 5½ | 5½ | Do. 5½ p.c. 'B' Cum. Pref. | 110–115 | ... |
| 120,000 | ,, | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 95–100 | ... |
| 450,000 | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 102–107 | ... |
| 450,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 95–100 | ... |
| 100,000 | 22 May'33 | 6 | 4 | Cape Town, Ltd. ... ... | 1⅛–2⅛ | ... |
| 100,000 | 6 Nov.'33 | 4½ | 4½ | Do. 4½ p.c. Pref. ... | 1⅛–3⅛ | ... |
| 150,000 | Dec. 13 | 4½ | 4½ | Do. 4½ p.c. Deb. ... | 70–75 | ... |
| 626,860 | Feb. 7 | 6 | 6 | Cardiff Con. Ord. ... ... | 120–125 | ... |
| 237,860 | Dec. 13 | 5 | 5 | Do. 5 p.c. Red. Deb. | 106–111 | ... |
| 98,936 | Mar. 21 | 2/- | 2/- | Colombo Ord.... ... ... | 1⅛–1⅞* | ... |
| 24,510 | ,, | 1/4½ | 1/4½ | Do. 7 p.c. Pref. ... ... | 23/–25/–* | –/6 |
| 739,453 | Mar. 21 | -/11·48 | -/11·48 | Colonial Gas Assn. Ltd. Ord. | 16/6–18/6* | –/6 |
| 296,144 | ,, | 1/3·30 | 1/3·30 | Do. 8 p.c. Pref. | 21/6–23/6* | –/6 |
| 1,775,005 | Feb. 7 | 5 | 5 | Commercial Ord. ... ... | 83–88 | ... |
| 620,000 | Nov. 29 | 3 | 3 | Do. 3 p.c. Deb. ... | 73–78 | ... |
| 286,344 | Feb. 7 | 5 | 5 | Do. 5 p.c. Deb. ... | 113–118 | ... |
| 807,560 | Feb. 21 | 7 | 7 | Croydon sliding scale... ... | 137–142 | ... |
| 644,590 | ,, | 5 | 5 | Do max. div. ... ... | 107–112 | ... |
| 620,385 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 115–120 | ... |
| 239,000 | Feb. 7 | 5 | 5 | East Hull Ord. 5 p.c.... ... | 96–101 | ... |
| 185,355 | Feb. 21 | 6 | 6 | East Surrey Ord. 5 p.c. ... | 118–123 | ... |
| 176,211 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... | 112–117 | ... |
| 250,000 | Nov. 15 | 7 | 4 | Gas Consolidation Ord. ... | 19/–21/– | ... |
| 250,000 | ,, | 4 | 4 | Do. 4 p.c. Red. Cum. Pref. | 18/6–20/6 | ... |
| 19,223,324 | Feb. 7 | 5⅜ | 5⅜ | Gas Light & Coke Ord. ... | 21/9–22/9a | –/3 |
| 2,600,000 | ,, | 3½ | 3½ | Do. 3½ p.c. max. ... | 82–85 | –1 |
| 4,477,106 | ,, | 4 | 4 | Do. 4 p.c. Con. Pref. | 99–102 | –1 |
| 2,993,000 | Jan. 17 | ... | 3⅜ | Do. 3⅜ p.c. Red. Pref. | 101½–103½ | ... |
| 8,602,497 | Nov. 29 | 3 | 3 | Do. 3 p.c. Con. Deb. | 78–81 | +½ |
| 3,642,770 | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. | 112–115 | ... |
| 3,500,000 | ,, | 4½ | 4½ | Do. 4½ p.c. Red. Deb. | 110–113 | ... |
| 700,000 | Mar. 7 | 3⅛ | 3⅛ | Do. 3½ p.c. Red. Deb. | 97–100 | ... |
| 270,466 | Feb. 21 | 6 | 6 | Harrogate New Cons. ... | 118–123 | ... |
| 157,500 | Mar. 21 | 1/2⅜ | 1/‡ | Hong Kong and China Ord .... | ¾–1* | ... |
| 213,200 | Feb. 7 | 6 | 6 | Hornsey Con. 3½ p.c. ... | 105–115 | –8½ |
| 5,600,000 | Nov. 1 | 12 | 8 | Imperial Continental Cap. ... | 118–123 | –1 |
| 223,130 | Jan. 17 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 88–93 | ... |
| 285,242 | Feb. 21 | 8½ | 8½ | Lea Bridge 5 p.c. Ord. ... | 167–172 | ... |
| 11,751 | Feb. 21 | 8 | 10 | Maidstone 5 p.c. Cap.... ... | 175–185 | ... |
| 63,480 | Dec. 13 | 3 | 3 | Do. 3 p.c. Deb. ... | 70–75 | ... |
| 75,000 | Nov. 29 | †10 | †10 | Malta & Mediterranean ... | 142–147 | –5½ |
| | | | | Metropolitan (of Melbourne) | | ... |
| 392,000 | Oct. 1 | 5½ | 5½ | 5½ p.c. Red. Deb. ... ... | 100–103 | ... |
| 231,977 | Feb. 21 | 5 | 5 | M.S. Utility 'C' Cons. ... | 99–104 | ... |
| 968,658 | ,, | 4 | 4 | Do. 4 p.c. Cons. Pref. | 95–100 | ... |
| 360,075 | Dec. 13 | 4 | 4 | M.S. Utility 4 p.c. Deb. ... | 97–102 | ... |
| 148,955 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 113–118 | ... |
| 675,000 | Nov. 15 | †9 | †6 | Montevideo, Ltd. ... ... | 75–80 | ... |
| 250,000 | Mar. 7 | 7½ | 7½ | North Middlesex 6 p.c. Con. | 145–150 | ... |
| 396,160 | Feb. 7 | 5 | 5 | Northampton 5 p.c. max. ... | 105–110 | –3 |
| 300,030 | Oct. 18 | †7 | †9 | Oriental, Ltd. ... ... ... | 153–158 | ... |
| 468,537 | Dec. 13 | 8 | 8 | Plymouth & Stonehouse 5 p.c. | 154–159 | ... |
| 621,667 | Feb. 7 | 8½ | 8½ | Portsmouth & Gosport Cons. | 160–165 | ... |
| 241,446 | ,, | 5 | 5 | Do. 5 p.c. max. ... | 102–107 | ... |
| 73,350 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 108–113 | ... |
| 247,966 | Dec. 13 | 4 | 4 | Primitiva 4 p.c. Cons. Deb. ... | 98–103 | ... |
| 625,959 | Jan. 17 | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 95–100 | ... |
| 15,000 | Mar. 21 | 6 | 6 | San Paulo 6 p.c. Cum. Pref. ... | 8¾–9¼* | –¼ |
| 441,275 | Sept. 20 | 1/1½ | 1/1½ | Severn Val. Gas Cor. Ld. Ord. | 21/–23/- | ... |
| 460,810 | Mar. 21 | -/10½ | -/10½ | ,, ,, 4½ p.c. Cum. Pref. | 19/–21/–* | –/6 |
| 133,201 | Feb. 7 | 8½ | 5 | Shrewsbury 5 p.c. Ord. ... | 128–133 | ... |
| 9,000 | June 7 | 4 | 4 | South African Ord. ... ... | 3¾–4¾ | ... |
| 1,371,752 | Sept. 6 | 1/2⅛ | 1/2⅛ | South East'n Gas Cn. Ld. Ord. | 23/–25/– | ... |
| 871,636 | Mar. 7 | -/10½ | -/10½ | Do. 4½ p.c. Red. Cum. Pref. | 20/–22/– | ... |
| 498,818 | ,, | 4 | 4 | Do. 4 p.c. Cum. Pref. ... | 18/–20/– | ... |
| 450,000 | Feb. 7 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 98–101 | ... |
| 150,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 95–98 | ... |
| 6,709,895 | Feb. 7 | 6 | 5 | South Met. Ord. ... ... | 104–107 | ... |
| 1,135,812 | ,, | 6 | 6 | Do. p.c. Irred. Pf. ... | 130–135 | ... |
| 850,000 | ,, | 4 | 4 | Do. 4 p.c. Irred. Pf. ... | 97–100 | ... |
| 1,895,445 | Dec. 13 | 3 | 3 | Do. 3 p.c. Deb. ... | 76–80 | ... |
| 1,000,000 | Jan. 17 | 5 | 5 | Do. 5 p.c. Red. Deb.... | 109–112 | ... |
| 1,543,795 | Feb. 7 | 6 | 6 | South Suburban Ord. 5 p.c. ... | 118–123 | ... |
| 512,825 | ,, | 5 | 5 | Do. 5 p.c. Pref.... | 110–115 | ... |
| 500,000 | ,, | 4 | 4 | Do. 4 p.c. Pref.... | 95–100 | ... |
| 250,000 | ,, | §18/9 | 3⅜ | Do. 3¾ p.c. Red. Pref. | 98–101 | ... |
| 888,587 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb.... | 115–120 | ... |
| 250,000 | ,, | 4 | 4 | Do. 4 p.c. Deb.... | 97–100 | ... |
| 200,000 | Sept. 20 | ... | 3½ | Do. 3½ p.c. Red. Deb. | 94–99 | ... |
| 427,859 | Nov. 1 | 1/2½ | 9½ | S. Western Gas & Water Ord. | 18/6–20/6 | ... |
| 160,523 | ,, | -/10½ | -/10½ | Do. 4½ p.c. Red. Cum. Pf. | 19/6–21/6 | ... |
| 110,000 | Dec. 13 | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 97–102 | ... |
| 750,541 | Feb. 7 | 5 | 5½ | Southampton Ord. 5 p.c. ... | 109–114 | ... |
| 148,836 | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb. | 96–101 | ... |
| 350,000 | Feb. 7 | 5½ | 5½ | Swansea 5½ p.c. Red. Pref. ... | 108–113 | ... |
| 94,000 | Jan. 3 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 95–100 | ... |
| 1,076,490 | Feb. 7 | 6¾ | 6¾ | Tottenham and District Ord. | 126–131 | ... |
| 409,835 | ,, | 5⅛ | 5⅛ | Do. 5⅛ p.c. Pref.... | 119–124 | ... |
| 62,235 | ,, | 5 | 5 | Do. 5 p.c. Pref.... | 108–113 | ... |
| 371,850 | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb.... | 97–102 | ... |
| 85,701 | July 19 | ‡6 | 6 | Tuscan 6 p.c. Red. Deb. ... | 96–101 | ... |
| 888,629 | Oct. 4 | 6 | 4 | U. Kingdom Gas Cor. Ord.... | 19/–21/- | ... |
| 937,743 | Nov. 15 | 4½ | 4½ | Do. 4½ p.c. 1st Cum. Pref. | 20/–22/– | ... |
| 500,000 | ,, | ... | -/1·15 | Do. 4 p.c. 1st Red. Cum. Pf. | 19/–21/– | ... |
| 745,263 | Dec. 13 | 4½ | 4½ | Do. 4½ p.c. 2nd Non-Cum.Pf. | 16/6–18/6 | ... |
| 1,000,000 | Mar. 7 | 3⅛ | 3⅛ | Do. 3⅛ p.c. Red. Deb. ... | 96–99 | ... |
| 373,939 | Feb. 7 | 7 | 7 | Uxbridge, &c., 5 p.c. ... ... | 133–138 | ... |
| 133,010 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 108–113 | ... |
| 1,371,138 | Feb. 7 | 7 | 7 | Wandsworth Consolidated ... | 135–140 | ... |
| 2,525,768 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... | 96–101 | ... |
| 1,343,964 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... | 115–120 | ... |
| 383,745 | ,, | 4 | 4 | Do. 4 p.c. Deb. ... | 98–103 | ... |
| 558,342 | Feb. 7 | 7 | 7 | Watford and St. Albans Ord. | 135–140 | ... |
| 200,000 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 110–115 | ... |
| 200,000 | ,, | 5½ | 5½ | Do. 5½ p.c Pref. ... | 120–125 | ... |
| 200,000 | Nov. 29 | 4 | 4 | Do. 4 p.c. Red. Deb. | 97–102 | ... |
| 100,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. | 95–100 | ... |

*a*.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax ‡ For year. § Actual.

**Supplementary List and Provincial Exchanges overleaf.**

# STOCK AND SHARE LIST—Cont.

## Supplementary List, not Officially Quoted, London

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 202,152 | Mar. 21 | 5 | 5 | Ascot Ord. ... ... ... | 103—108* | —2 |
| 128,182 | Dec. 13 | 5 | 5 | Do. 5 p.c. Pref. ... | 108—113 | ... |
| 31,035 | Mar. 21 | ... | -/4½ | Associated Utilities 4 p.c. Pref. | 16/—18/-* | —/6 |
| 100,000 | Dec. 13 | ... | 3½ | Do. 3½ p.c. Red. Deb.... | 95—100 | ... |
| 17,000 | Feb. 21 | 8 | 8 | Bognor Orig. Ord. 'A' ... | 155—165 | ... |
| 62,210 | ,, | 8 | 8 | Do. New Addl. 'A' ... | 155—165 | ... |
| 87,160 | ,, | 7 | 7 | Do. New 7 p.c. max. ... | 152—157 | ... |
| 37,440 | Feb. 7 | 10 | 10 | Cam. Univ. & Town 10 p.c. max. | 190—200 | ... |
| 125,970 | ,, | 7 | 7 | Do. 7 p.c. max. ... ... | 135—140 | ... |
| 39,025 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 97—102 | ... |
| 96,410 | Feb. 7 | 4½ | 4½ | Cardiff 4½ p.c. Pref. ... ... | 95—100 | ... |
| 150,000 | Feb. 21 | 4 | 4 | Croydon 4 p.c. Pref. ... ... | 97—101 | ... |
| 130,000 | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 97—102 | ... |
| 65,000 | Mar. 7 | 7½ | 8½ | Eastbourne 'A' 5 p.c. ... | 155—160 | ... |
| 198,000 | ,, | 6 | 7 | Do. 'B' 3½ p.c. ... ... | 126—131 | ... |
| 112,312 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 107—112 | ... |
| 130,000 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 113—118 | ... |
| 24,000 | Feb. 21 | 8½ | 8½ | Great Yarmouth 8½ p.c. max. | 43—48 | ... |
| 59,400 | ,, | 7½ | 7½ | Do. 7½ p.c. max. ... ... | 33—38 | ... |
| 51,160 | Dec. 13 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 120—125 | ... |
| 152,600 | Feb. 21 | 8 | 9 | Guildford Cons. ... ... | 167—172 | ... |
| 54,055 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 108—113 | ... |
| 68,250 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 112—117 | ... |
| 156,600 | Feb. 21 | 7½ | 7½ | Hampton Court Cons. ... | 142—152 | ... |
| 80,000 | Feb. 21 | 4 | 4 | Lea Bridge 4 p.c. Pref ... | 94—99 | ... |
| 60,000 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... | 123—128 | ... |
| 94,876 | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb. ... | 97—100 | ... |
| 73,620 | Mar. 7 | 8½ | 8½ | Luton Cons. 'A' ... ... | 160—165 | ... |
| 107,960 | Mar. 21 | 4 | 5½ | Mid Kent Ord. ... ... | 8½—9½* | ... |
| 230,940 | Feb. 7 | 10 | 10 | Oxford & District Ord. ... | 202—207 | ... |
| 47,112 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 10t—111 | ... |
| 50,000 | ,, | 6 | 6 | Do. 6 p.c. Red. Pref. ... | 108—113 | ... |
| 126,193 | Nov. 15 | 7½ | 7½ | Peterborough Ord. ... ... | 158—163 | ... |
| 64,990 | Mar. 7 | 6½ | 7½ | Redditch Ord.... ... ... | 122—132 | ... |
| 166,850 | Feb. 7 | 8 | 8 | Romford Ord.... ... ... | 148—153 | ... |
| 60,000 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... ... | 97—100 | ... |
| 44,000 | Mar. 21 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 111—116* | —2 |
| 25,570 | Feb. 7 | 5½ | 5½ | Rugby 5½ p.c. Pref. ... ... | 123—128 | ... |
| 25,000 | ,, | 6 | 6 | Do. 6 p.c. Red. Pref. ... | 103—108 | ... |
| 42,750 | Dec. 13 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 120—125 | ... |
| 10,950 | Feb. 21 | 8 | 8 | Ryde Ord. ... ... ... | 140—150 | ... |
| 270,086 | Mar. 21 | 7 | 7 | Slough Ord. ... ... ... | 133—138* | ... |
| 21,000 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 110—115 | ... |
| 28,872 | Nov. 1 | 5½ | 5½ | S. Midland Gas Cpn. Ltd. Ord. | 19/—21/- | ... |
| 28,866 | Mar. 7 | 4½ | 4½ | Do. 4½ p.c. Red. Cum. Pref. | 18/6—20/6 | ... |
| 137,730 | Feb. 21 | 7 | 7 | Southgate & Dist. 7 p.c. max. | 135—140 | ... |
| 62,500 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 110—115 | ... |
| 117,228 | Feb. 7 | 5 | 7 | Swindon Cons. ... ... | 104—109 | ... |
| 60,425 | Dec. 13 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 110—115 | ... |
| 64,380 | Dec. 13 | 5 | 5 | Torquay and Paignton 5 p.c. Pf. | 108—113 | ... |
| 33,858 | Nov. 15 | ... | -/2·70b | United Kingdom Gas Corpn. 4½ p.c. 1st Cum. Pref. ... | 18/—20/- | ... |
| 130,000 | Feb. 7 | 5 | 8 | Wakefield Ord. ... ... | 118—123 | ... |
| 81,650 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 101—106 | ... |
| 82,000 | Feb. 21 | 6 | 6 | Weymouth Ord. ... ... | 105—110 | ... |
| 98,384 | Feb. 7 | 6 | 6 | Wolverhampton 6 p.c. Pref.... | 118—123 | ... |
| 160,000 | Dec. 13 | 5½ | 5½ | Do. 5½ p.c. Rd. Db. | 107—112 | ... |
| 90,000 | Dec. 13 | 5 | 5 | York 5 p.c. Red. Deb.... ... | 104—109 | ... |
| 133,640 | Feb. 21 | 6½ | 6½ | Yorktown (Cam.) 5 p.c. Cons. | 126—131 | ... |
| 120,000 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 106—111 | ... |
| 35,000 | Dec. 13 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 121—126 | ... |

### BRISTOL EXCHANGE

| Issue. | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations, Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 347,756 | Feb. 7 | 5 | 6 | Bath Cons. ... ... ... | 120—122 | +2 |
| 1,667,250 | Feb. 7 | 5 | 5 | Bristol, 5 p.c. max. ... ... | 113—115 | ... |
| 120,420 | Dec. 13 | 4 | 4 | Do. 1st 4 p.c. Deb. ... | 100—102 | ... |
| 217,870 | ,, | 4 | 4 | Do. 2nd 4 p.c. Deb. ... | 100—102 | ... |
| 328,790 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... ... | 119—122 | ... |
| 274,000 | Feb. 21 | 5 | 5 | Newport (Mon.) 5 p.c. max.... | 99—101 | ... |
| 13,200 | Mar. 21 | 7 | 8½ | Pontyp'l Gas & W. 10 p.c. 'A' | 12½—13½* | —½ |
| 13,600 | ,, | 5 | 6 | Do. 7 p.c. 'B' | 11½—12½* | —½ |
| 40,000 | ,, | 5 | 6 | Do. 7 p.c. 'C' | 11½—12½* | —½ |
| 140,778 | Feb. 7 | 5 | 5 | Weston-super-Mare Cons. ... | 110—112 | ... |
| 64,338 | Jan. 3 | 4 | 4 | Do. 4 p.c. Deb. | 94½—96½ | ... |
| 33,340 | ,, | 7½ | 7½ | Do. 7½ p.c. Deb. | 154—157 | ... |

### LIVERPOOL EXCHANGE

| Issue. | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations, Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 157,150 | Feb. 7 | 5 | 6½ | Chester 5 p.c. Ord. ... ... | 103½—107½ | ... |
| 92,500 | Dec. 13 | 4 | 4 | Do. 4 p.c. Pref. ... ... | 96—100 | ... |
| 36,430 | ,, | 3½ | 3½ | Do. 3½ p.c. Deb. ... ... | 88—91 | ... |
| 41,890 | ,, | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 97—101 | ... |
| 2,167,410 | Feb. 21 | 6 | 6 | Liverpool 5 p.c. Ord.... ... | 123½—124½ | ... |
| 245,500 | Dec. 13 | 5 | 5 | Do. 5 p.c. Red. Pref. ... | 99—104 | ... |
| 306,083 | Jan. 17 | 4 | 4 | Do. 4 p.c. Deb. ... | 100—102 | ... |
| 106,280 | Feb. 7 | 10 | 10 | Preston 'A' 10 p.c. ... ... | 202—212 | ... |
| 188,219 | ,, | 7 | 7 | Do. 'B' 7 p.c. ... ... | 144—154 | ... |

### NEWCASTLE EXCHANGE

| Issue. | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations, Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 122,577 | Feb. 21 | 8 | 8 | Blyth 5 p.c. Ord. ... ... | 163½—164½ | ... |
| 732,000 | Feb. 21 | 5 | 5 | Hartlepool G. & W. Cn. & New | 110—112 | ... |
| 2,061,315 | Feb. 7 | 5 | 5⅞ | Newcastle & Gateshead Con. | 21/9—22/3a | —/3 |
| 682,856 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... | 98—100 | ... |
| 776,706 | Jan. 3 | 3½ | 3½ | Do. 3½ p.c. Deb. ... | 91½—92½ | ... |
| 277,285 | Nov. 1 | 5 | 5 | Do. 5 p.c. Deb. '43... | 103—105 | ... |
| 332,351 | Feb. 7 | 6 | 6 | Sunderland 6 p.c. max. ... | 137—139 | ... |

### NOTTINGHAM EXCHANGE

| Issue. | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations, Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 542,270 | Feb. 21 | 6 | 9 | Derby Con. ... ... ... | 135—145 | ... |
| 55,000 | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 100—105 | ... |
| 20,000 | Dec. 13 | 5 | 5 | Long Eaton 5 p.c. Pref. ... | 10—12 | ... |
| 80,000 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 105—110 | ... |

### SHEFFIELD EXCHANGE

| Issue. | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations, Mar. 25. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 10,000 | Feb. 21 | 10 | 10 | Great Grimsby 'A' Ord. ... | 210—220 | ... |
| 6,500 | ,, | 10 | 10 | Do. 'B' Ord. ... | 210—220 | ... |
| 79,000 | ,, | 10 | 10 | Do. 'C' Ord. ... | 205—210 | ... |
| 1,806,339 | Feb. 21 | 6½ | 6½ | Sheffield Cons. ... ... | 142—145 | ... |
| 95,000 | Jan. 3 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 100—103 | ... |

*a* The quotation is per £1 of Stock. *b* Actual. * Ex div.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| Rise or Fall on Week. |
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